AMERICAN GAS ASSOCIATION MONTHLY

JUNE · 1937

Natural Gas Convention Sets Record

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AMERICAN GAS ASSOCIATION MONTHLY

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General view of A.G.A.E.M. exhibition of gas appliances and equipment which was a major attraction at the Natural Gas Department Convention in Kansas City.

AMERICAN GAS
ASSOCIATION
MONTHLY

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James M. Beall, Editor

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Natural Gas Convention Sets Record

MORE than doubling the attendance of any Natural Gas Department Convention in recent years and establishing an all-time record in this respect, the five-day meeting of the Department in Kansas City, Mo., May 10-14, was hailed by leaders of the industry as the most successful in its history. Final registration figures were approximately 2,700.

A new high in quality of papers presented and an outstanding exhibition of gas appliances and equipment, sponsored by the Association of Gas Appliance and Equipment Manufacturers, as well as the splendid hospitality of the local gas company men, contributed largely to the success of the convention. The magnificent Municipal Auditorium, in which all meetings as well as the exhibition were held, provided the last word in comfortable and luxurious surroundings and made the convention setting a memorable one.

The entertainment functions were well attended and received with enthusiasm. There were 1,825 present at the Banquet Wednesday night, which was the high spot of the entertainment program.

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The convention fully demonstrated the vitality of the natural gas industry which has undergone an amazing expansion in recent years yet still maintaining its essential stability. Many of the technical papers particularly reflected the thoroughness and vigor with which the industry is attacking its problems.

In his opening remarks before the first general session, George E. Welker, chairman of the Natural Gas Department, pointed out that the natural gas industry ranks third among the fuel industries and is considered one of the nation's basic industries. Natural gas now contributes to the welfare of approximately eight million families, Mr. Welker stated, and its service has been extended to a large percentage of the principal cities in most of the States of the country.

"We look back with pride to some of our accomplishments during the past year which marked a general re-awakening to the many opportunities lying ready and waiting our attention," he said. "We made 1936 a record-breaking year in the production and sale of our product with estimated aggregate production of natural gas of over two trillion cubic feet, an all-time high, and with very appreciable percentage increases in the number of customers attached to our lines and thousands of cubic feet of natural gas sold."

Following the Invocation by Dr. Burris A. Jenkins, Pastor, Community Church, Kansas City, Major T. J. Strickler, vice-president, Kansas City Gas Company, introduced the Honorable Bryce B. Smith, Mayor of Kansas City, who heartily welcomed the natural gas men to the city. Mayor Smith recalled that the organization meeting of the old Natural Gas Association of America was held in Kansas City thirty years ago, and the convention had returned to that city several times since.

In a vigorous and forthright address, Herman Russell, president of the American Gas Association and president of the Rochester Gas & Electric Corp., Rochester, N. Y., stressed the importance of the domestic load to the natural gas industry and urged the necessity for greater research to protect and extend the markets for gas. President Russell's address appears in full elsewhere in this issue.

Following President Russell on the program, Alexander Forward, managing director, American Gas Association, expressed regret over the resignation of Captain A. E. Higgins as secretary of the Natural Gas Department. Before the convention was concluded it was announced that E. Holley Poe, of Tulsa, Okla., had been appointed to succeed Captain Higgins.

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The next activity to which the gas industry must turn its attention, Mr. Forward brought out in his remarks, is the very large and important place home building occupies in the minds of our people. "It is a fact," he said, "that even with all of the current agitation and newspaper and magazine articles and the Washington ballyhoo, the home building going on today is not even enough to replace current depreciation and obsolescence; to say nothing of the enormous accumulated deficit in homes from the depression years."

Something is being done to remedy this situation, he added. "More than one thousand low cost homes in the United States are now under construction by the National Lumbermen's Association and the National Retail Lumber Dealers Association, and are to be placed on exhibit June 1. We know from experience that many thousands of people

was a major attraction at the Natural Gas Department Convention in Kansas City.

will inspect them, looking for the latest suggestions and the latest comforts for their own homes. The American Gas Association has arranged for promotional material in every one of these homes to indicate to those interested the necessary part gas must play in modern comfort and convenience."

Natural Gas Expansion

That the natural gas industry has made great strides in recent years was brought out by Dr. John W. Finch, director, United States Bureau of Mines, in an address on "Economic Trends in the Consumption of Natural Gas." The ten-year period from 1926 to 1935, inclusive, Dr. Finch stated, witnessed an enormous increase in the total consumption of natural gas as well as a widespread extension in market areas resulting from the construction of a network of long-distance pipe lines in the first half of the period. "The total consumption of natural gas increased by 597 billion cubic feet, or from 1,313 billion in 1926 to 1,910 billion in 1935. Preliminary estimates for 1936 indicate a possible consumption of over 2,170 billion cubic feet. This figure represents an all-time peak and might very roughly be considered as the fuel equivalent of about 100 million tons of coal."

After deducting the amount used in the manufacture of carbon black and the amount used as fuel in oil and gas field operations, 385 billion cubic feet represent the growth in domestic, commercial and other industrial uses, during the ten-year period from 1926 to 1935, Dr. Finch reported. The total for this group was 703 billion cubic feet in 1926 and 1,088 billion in 1935. Interstate shipments of natural gas, exclusive of exports, totaled 210 billion cubic feet in 1926 and 462 billion in 1935, and represented 30 per cent of the above sales in 1926 and almost 43 per cent in 1935. "This percentage," Dr. Finch pointed out, "undoubtedly will increase as the interstate lines continue to develop their markets."

Dr. Finch stressed the fact that on a regional market basis, "the Appalachian district showed a loss of 30 billion cubic feet for the ten-year period under discussion, while all other districts showed increases—149 billion in the North Central district, 38 billion in the Southeastern district, 94 billion in the South Central district, 41 billion in the Rocky Mountain States and 93 billion in California."

At the close of the first general session, Will C. Grant, director of public relations, Lone Star Gas Company, Dallas, Texas, paid impressive tribute to men in the industry who had died during the year.

The second general session was sponsored by the Main Technical and Research Committee under the chairmanship of H. C. Cooper, president and general manager, Hope Natural Gas Company, Pittsburgh.

Research Reports

T. R. Weymouth, chairman of the Gas Measurement Subcommittee, made a brief progress report indicating that this subcommittee had been comparatively inactive during the year but contemplated several important studies in the near future.

The report of the Pipe Line Subcommittee was presented by the chairman, H. D. Hancock. This subcommittee is engaged in long range research work in natural gas pipe line problems and at present is occupied with an investigation concerning natural gas hydrates and the dehydration of natural gas, and also is directing attention to current developments in pipe, valve and other pipe line material specifications. The investigation of gas hydrates and their relation to pipe line operation is being conducted by the U. S. Bureau of Mines under a cooperative arrangement with the American Gas Association.

At this point on the program, Mr. Hancock introduced W. M. Deaton, of the Bureau of Mines, who presented an authoritative report on the work completed to date in the gas hydrate investigation. Mr. Deaton's report, made in collaboration with E. M. Frost, appears elsewhere in this issue. Another important study of gas hydrate formation covering the use of anhydrous ammonia, was presented later in the program by J. T. Russell, Panhandle Eastern Pipe Line Company, Liberal, Kansas. It is hoped to publish this

(Continued on page 206)

Six-year-old Barbara Jenkins showing the grown-ups how to cook on a modern gas range

A real welcome was given delegates at the booth of the Kansas City Gas Company, pictured above. The charming lady is secretary to Ray Ratliff, advertising manager

Annual dinner of the executive, managing and advisory committees of the Natural Gas Department during the convention

R. A. Cattell, chief engineer, petroleum and natural gas division, Bureau of Mines, Washington, D. C., and E. L. Rawlins, United Gas Public Service Co., Houston

J. F. Owens, Oklahoma City, and Col. M. W. Walsh, Louisville, Ky., both charter members of the old Natural Gas Association of America

New Orleans, seeking the 1938 natural gas convention, sent two "mammies" to Kansas City to pass out pralines to advertise that city's bid for the meeting. Shown here are Jay Barnes, New Orleans Public Service Inc., Captain A. E. Higgins, retiring secretary of the Natural Gas Department, J. W. Ross, New Orleans, and the "mammies"

Meeting of the Main Technical and Research Committee. Left to right: H. C. Cooper, Pittsburgh, chairman; T. R. Weymouth, New York, vice-chairman; H. E. Bates, Chicago; H. D. Hancock, New York; T. H. Kerr, Columbus; H. P. George, Los Angeles; H. S. Bean, Washington, D. C.; J. French Robinson, Pittsburgh; Ben Lawler, Los Angeles; R. H. Hargrove, Houston; F. F. Doyle, San Francisco; George E. Welker, Oil City, chairman. Natural Gas Department; Frank L. Chase, Dallas

paper in full in a future issue of the MONTHLY.

In the absence of N. C. McGowen, chairman of the Gas Well Deliveries Subcommittee, R. H. Hargrove, vice-president, United Gas Public Service Company, Houston, Texas, discussed the work of that subcommittee. This subcommittee is devoting its attention to combination well studies with the dual purpose of gaging gas well deliveries and conserving gas in these combination wells. While this work has been in progress two years no definite conclusions have been reached but important results have been obtained which will be announced later.

A paper reviewing present methods of making manufactured gases by George M. Parker, Mississippi River Fuel Corp., St. Louis, Mo., concluded the Tuesday general session.

Robert W. Hendee, vice-chairman of the Natural Gas Department, presided at the third general session held Wednesday morning. The first business of this meeting was the report of the Supply Men's Fund Committee by George E. Welker, chairman, which described the natural gas fellowships maintained at the University of Oklahoma and West Virginia University.

National Advertising Discussed

Following Mr. Russell's paper on "The Use of Anhydrous Ammonia To Inhibit Gas Hydrate Formation," mentioned previously, Major T. J. Strickler, chairman of the Committee To Conduct National Advertising, spoke on the national advertising campaign being conducted by the American Gas Association. Major Strickler made a thorough presentation of the publicity phase of the campaign.

Publicity work in conjunction with the campaign, Major Strickler pointed out, was formulated with certain definite objectives in mind. "When we launched this activity, we knew that space advertising could be depended upon to do a hard selling job," he stated. "We knew that it would strike out vigorously, and boldly tell of the virtues of gas. We knew, furthermore, that gas companies would increase their use of local newspaper advertising space, direct mail literature and all other media, to get their money's worth out of this drive by identifying themselves with it. All of these steps have been accomplished, exactly as we planned.

"But we were not satisfied to stop there. We felt that publicity should play a very important part in this campaign to put our industry on the map. We knew that it would be valuable in selling the American public the idea of gas as the up-to-the-minute fuel. We knew that it would help establish the fact that today's gas appliances set the pace for style.

"Consequently we set out to build a campaign which would stress the modernity theme. We asked our agency to picture gas equipment in modern surroundings, to show that gas ranges are distinctly in vogue by displaying them with modern women, in modern settings. We told them to tie-in our story with current events, with the news of the day, to keep gas in the forefront of this news, and to bring gas alongside of modern developments of many kinds."

The session concluded with a discussion of the Natural Gas Extension Course at the University of Kansas, Lawrence, Kansas, by Professor C. M. Young. Enrollment in the course has been something of a surprise, Professor Young reported, both in numbers and character. Present indications are "that the work may go on with a fairly steady number of students, say 200 to 250, for a considerable number of years," he said. An advisory committee of the American Gas Association assisted in preparation of the course.

Wrinkle Contests

The Thursday general session opened with a report of the Wrinkle Committee which was made by Robert W. Hendee in the absence of the chairman, John H. Schalek. Citing the great number of improvements in operating practice resulting from ideas submitted in the Wrinkle contest, the committee indicated that more prizes would be awarded in future contests to stimulate wider participation.

"Maintaining High Efficiencies in Pipe Lines" was the subject of an excellent paper presented at this session by J. C. Reinbold, Panhandle Eastern Pipe Line Company, Kansas City, Mo.

Natural Gas Convention Resolution

The following resolution was unanimously adopted at the Natural Gas Convention:

"A successful convention such as we have just enjoyed lasts only a few short days, but requires many months of hard work and detailed planning. The success of this Convention of the Natural Gas Department of the American Gas Association held in Kansas City, Missouri, May 10-14, has been due, in great measure, to a year's tireless effort on the part of the officers of the department headed by George E. Welker, Chairman; Robert W. Hendee, Vice-Chairman; and A. E. Higgins, Secretary; Managing Director Forward, and his able staff in New York and Dallas.

"We, the Committee on Final Resolutions, offer the following resolution:

"RESOLVED, that appreciation is hereby expressed for the splendid work and cooperation of the officers and members of the Kansas City Gas Company in making this Convention so pleasant and successful.

"We commend and wish to express our appreciation for the work and effort of T. J. Strickler, general chairman; C. D. Greason, chairman of the Publicity Committee; P. C. Ford, chairman of the Banquet and Entertainment Committee; Ray T. Ratliff, chairman of the Attendance Committee; and Mrs. B. C. Adams, chairman of the Women's Committee. We also wish to express our appreciation to all of the members who served on these various local committees.

"To Mayor Bryce B. Smith, and Judge Henry F. McElroy, City Manager, and the many other city officials, we express our appreciation for the many courtesies they extended us during our visit. We further wish to thank the complete staff of Kansas City's new Municipal Auditorium. Their contribution to the success of this Convention is much appreciated. The citizens of Kansas City are to be congratulated upon having such a beautiful Auditorium and are indeed fortunate in having such an efficient staff in charge.

"BE IT FURTHER RESOLVED, That the Association expresses its appreciation for the continued splendid work being carried on by the main Technical and Research Committee and its subcommittees, under the able and efficient leadership of H. C. Cooper. To all of the chairmen of the various committees and their members, we wish to express our appreciation and thanks for their work during the past year."

The comparatively recent construction of large diameter gas transmission lines designed for higher and higher operating pressures and in which hundreds of miles exist between supply and market has made increasingly important the maintenance of high efficiencies, he said.

Mr. Reinbold stressed the importance of line patrolling as the link to efficient operations and emphasized the necessity for proper training of patrolmen. He also discussed many other factors in pipe line operation and maintenance including emergency repairs, back fill, highways, electric welding on lines under pressure, and other subjects.

Able discussions of Mr. Reinbold's paper were made by J. W. Ferguson, Colorado Interstate Gas Company, Colorado Springs, Colo., and Julian C. Foster, Lone Star Gas Company, Dallas, Texas.

Sales Objectives

In one of the most stimulating papers presented at the convention, B. H. Gardner, Columbia Gas & Electric Corp., Columbus, Ohio, discussed the domestic and industrial sales objectives of the natural gas industry. "When we view all of the facts," he said, "we can see that to fully meet our sales responsibilities calls for something more than a desultory or haphazard appliance activity."

To protect our present cooking load, Mr. Gardner urged a drive on obsolete gas ranges, more aggressive sales methods, more advertising and increased use of such methods of mass education as the cooking school and radio program. He named the aggressive promotion of gas refrigeration as one effective means of holding the gas cooking load by proving that gas service has a definite place in the modern home. The gas refrigerator is also an important load builder, he added, although house heating offers the best opportunity to most natural gas companies for increasing domestic sales.

Our main objective in developing the industrial load, Mr. Gardner said, "should be to develop equipment and methods by which natural gas is applied in such a way and at such efficiency that no other method can be considered competitive." He pointed to the radiant tube furnace as a development of this character.

Meetings held during the Natural Gas Department Convention in Kansas City, Mo., May 10-14, other than the general sessions, are reported in separate articles in this issue on the following pages:

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Widespread interest at the convention was shown in the paper on "Gas-Reserve Problems Dealing with Availability of Natural Gas from Gas Reservoirs and Conservation of Gas in Its Occurrence with Oil" by E. L. Rawlins, United Gas Public Service Company, Houston, Texas. Mr. Rawlins stressed the importance of studying production practices to conserve natural gas reserves. In a discussion of a few factors that influence delivery capacities of gas wells, he emphasized the importance of correlating abilities of individual wells to produce gas, proper spacing of wells, and equalized withdrawal rates from a reservoir to secure conservation of gas reserves.

Conservation Progress

"It is particularly important," Mr. Rawlins said, "to understand more fully basic relationships involving pressures, volumes, and fluid characteristics in reservoirs that affect delivery capacities of gas wells to enable establishing broad policies dealing with well spacing and conservation of reserves definitely within the industry." He also emphasized the importance of some of the technical and legal problems about conservation of both oil and gas in combination fields.

J. H. Dunn, Lone Star Gas Company, Dallas, Texas, in a discussion of Mr. Rawlins' paper, spoke of the seriousness of some of the present conservation problems. "When we look back into the history of the industry," he said, "we find without exception that the horrible examples of waste have been directly attributable to the unbalanced condition between supply and demand. That was true in Rhodessa field, it was true in the Panhandle field, and it is true in many other fields today."

No one yet has found a way to regulate, control, or change the basic law of supply and demand, Mr. Dunn brought out. "The best that we may hope to do would be to bring our operations more nearly in line with this basic law."

The final convention program Friday morning was confined to two feature attractions, Barbara Jenkins, the six-year-old cooking wonder from Denver, Colo., and a personal appearance of the famous Mystery Chef, who is currently broadcasting on a radio network representing gas companies with more than six million consumers.

Little Barbara put on a show which was the delight of her audience. She operated two gas ranges simultaneously on either side of the stage and cooked two delicious meals, meanwhile explaining to her listeners just how each dish was prepared. It was a conclusive demonstration of the ease with which even a child can cook successfully on modern gas ranges.

The Mystery Chef made an inspiring and informative address on the subject, "Gas Still Stands Unchallenged." Speaking with fluency and persuasiveness which have made him a leading radio personality, he brought out the reasons why he considers gas the supreme fuel for cooking. His appearance was one of the high lights of the convention.

The meeting concluded with the report of the Resolutions Committee commending the work of various officers and committees who contributed to the success of the convention.

Manufacturers Meet in Kansas City

THE Association of Gas Appliance and Equipment Manufacturers held a meeting May 9 in the Municipal Auditorium at Kansas City, Mo., prior to the opening of the Natural Gas Department Convention. William T. Rasch, president of the association, presided and reviewed the work of the association during the year. He also commented on the excellent cooperation of the manufacturers in supporting the large exhibition of gas appliances and equipment sponsored by the A. G. A. E. M. in conjunction with the convention.

Other speakers at the meeting were Herman Russell, president, American Gas Association, and Hugh H. Cuthrell, vice-president, The Brooklyn Union Gas Company, Brooklyn, N. Y.

Production and Transmission Problems Discussed in Kansas City

NATURAL gas production and transmission problems were discussed at sessions devoted exclusively to those subjects at the Natural Gas Department convention in Kansas City. The production meeting was held Wednesday afternoon, May 12, with E. J. Rawlins, United Gas Public Service Company, Houston, Texas, acting as chairman. The transmission meeting, under the chairmanship of F. F. Doyle, Pacific Gas and Electric Co., San Francisco, Calif., took place Thursday afternoon, May 13. Both sessions were well attended and characterized by lively discussions.

"Drilling Equipment Improvement and Changes" was the first subject on the production program. An excellent paper on this subject, prepared by C. E. Reistle, Jr. and S. T. Sikes, Jr., of the Humble Oil and Refining Co., Houston, Texas, was presented by Mr. Reistle.

Drilling Speed Doubled

Improvements and changes in equipment have affected drilling time markedly, Mr. Reistle stated. "By increasing circulation rate of drilling fluid and weight carried on the bits, using proper rotary speeds, and improving the drill bits, drilling speed has been doubled, and now averages approximately 50 feet per hour in the Gulf Coast and 100 feet per hour in East Texas. Standardization and unitization of rigs, and increase in efficiency of drilling equipment have effected savings in time, repairs and transportation. Pressure control equipment now affords more protection, and by allowing the use of light weight muds of low viscosity, drilling speed has been benefitted. By means of modern completion equipment, formations may be more accurately identified, located and selected for production than ever before."

In a paper, "Increasing the Flow from Small Producing Gas Wells" by S. W. Meals, Carnegie Natural Gas Company, Pittsburgh, Pa., it was brought out that there are over 32,000 shallow sand wells in Pennsylvania and West Virginia with an average daily production of approximately 30,000 cu.ft. per well. An interesting discussion of the peculiar problems presented by this situation was presented in Mr. Meal's paper.

L. A. Farmer, Oklahoma Natural Gas Company, Tulsa, Okla., concluded the session with an outstanding report on "The Prolongation of the Life of Gas Wells." The value of accurate records, both of conditions encountered during the drilling of the well and of the history of its productive life, was emphasized by Mr. Farmer. "The first essential of this record," he said, "is an accurate graphic log to be made during the drilling of the well. This log should show steel line measurements to all sands encountered, whether productive or otherwise, as well as similar measurements on all casing points and finally on the bottom of the well."

The meeting sponsored by the Natural Gas Transmission Committee, F. F. Doyle, chairman, held May 13, was devoted entirely to a discussion of "Recent Developments in Gas Compression Machinery." Prepared papers on this subject were presented by: Charles E. Norton, S. R. Dresser Manufacturing Co., Bradford, Pa.; J. B. O'Connor, Clark Brothers, Olean, N. Y.; B. C. Thiel, Cooper-Bessemer Company, Mt. Vernon, Ohio; and H. C. Lehn, Worthington Pump and Machinery Corp., Harrison, N. J.

L. B. Denning Speaker

L. B. DENNING, of Dallas, Texas, president of the Lone Star Gas Corporation and past president of the American Gas Association, was the principal speaker at a luncheon meeting of the Kansas City Chamber of Commerce held May 12 during the annual convention of the Natural Gas Department. A large delegation from the convention heard Mr. Denning discuss the subject, "The Coming American."

E. Holley Poe, New Secretary Natural Gas Department

E. HOLLEY POE, of Tulsa, Oklahoma, has been appointed secretary of the Natural Gas Department of the American Gas Association, succeeding Captain A. E. Higgins, of Dallas, Texas, who resigned to become vice-president of the Pittsburgh Equitable Meter Company, Pittsburgh, Pa.

The office of the Natural Gas Department will continue to be in the Dallas Gas Building, Dallas, Texas, and Mr. Poe will make his headquarters there.

E. Holley Poe

A native of Oklahoma, Mr. Poe has had a varied career in the natural gas and oil industries, including considerable operating experience. Educated in the public schools of Tulsa and Morgan School, Fayetteville, Tenn., he spent his summer vacation periods working in the oil and gas fields as a roustabout. After preparatory school he studied law for two years in the office of his father. During this period he looked after insurance adjustments, commercial matters, brief work, tax matters and accounting.

Following this, Mr. Poe was employed by the Slick Oil Company in various office capacities until January 1, 1916, when this company was sold to The Sinclair Oil Company. At that time he became engaged in business for himself and built and sold several gasoline plants. On September 1, 1918, he joined the Tidal Oil Company, where he worked under C. E. Hane, then vice-president and secretary-treasurer of that company.

In June, 1920, he joined several associates in the organization of the Wooster Oil Company, Henryetta Gas Company and Tiger Mountain Oil Company, with headquarters in Tulsa, Oklahoma. Mr. Poe stayed with this group until September, 1927, when the gas producing, transportation and distribution properties of these companies were purchased by Central States Power and Light Corporation, Tulsa. With the sale of these properties, he joined the Central States organization, being employed for the past few years in various capacities including operations, property acquisition, preliminary appraisals, public policy and other general executive duties.

Mr. Poe is a member of the Board of Governors of the Associated Industries of Oklahoma, president of the Oklahoma State Safety Council, and member of the Public Policy Committee, Oklahoma Utilities Association.

He is married and has two sons, one 18 years old, who is enrolled in Chemical Engineering in the University of Oklahoma, and the other 13, a student in Junior High.

Competing for the Domestic Fuel Dollar

By HERMAN RUSSELL*
President, American Gas Association

LAST year, 1936, according to figures prepared by the statistical department of the American Gas Association, the sales of natural gas in the United States amounted to 1,240,986,000,000 cu.ft., and the total revenue from sales was $412,649,000. Domestic sales including house heating were 346,396,000,000 and the revenue from this source was $236,962,000. The domestic sales were 28% of the total in cu.ft., but 57% of the revenue. The average rate for domestic business was 68¢ as compared with 20¢ for commercial and industrial.

Importance of Domestic Load

These figures show the tremendous importance of the domestic market to the natural gas industry and the necessity of holding and extending this market if our industry is to prosper. The battle for this market is being fiercely fought—coal, oil, gas, electricity are the contestants. Victory will go to that industry which has most to offer to the consumer in the way of appearance, convenience, low cost and performance. The weapons of warfare are intensive sales campaigns and a well organized research program. Gas has many advantages to offer in the way of economy and performance, but unless intelligent and energetic use is made of the weapons with which the battle must be fought, the fight will be lost to our competitors.

The cheapest is not always the best, nor does the public always buy that which is best. People buy because they are not satisfied with what they have and effective salesmanship operates to create dissatisfaction and desire in the minds of the customer. The electric industry competing for the domestic market offers a striking example of what effective sales and showmanship can accomplish in the face of heavy odds as to cost and performance. Today the public is definitely "electric minded." The housewife has seen electricity take the drudgery out of her daily work; electric lights have replaced oil lamps; electric washing machines the back-breaking laundry tub; the vacuum cleaner the broom; the refrigerator the ice box; electric toasters, ironers, percolators, curling irons, all offer her their aid; the radio brings entertainment. The appeal is made on the grounds of health, comfort and modernity. Today the woman in the home and the man as well, is ready to accept the electric range and water heater as the future if not the present appliance to do the cooking and heat the water for the household.

Very recently a domestic market survey was made in Rochester by a well-known national agency. A summary of the information from the first 400 of these homes has been tabulated and reveals some interesting information.

A—Cooking

1. 98% of the customers do their own cooking.
2. Only 20% have ever seen a home service demonstration.
3. 40% not interested in home service demonstration.
   20% would prefer individual home service demonstration.
   40% would prefer group home service demonstration.
4. Approximately 50% use oven three or less times a week; about 40% three or more times a week, and 10% occasionally, or don't know.
5. 60% prefer flat table top range.
   30% prefer oven above burners.
   10% no preference.
6. About 40% not familiar with features of modern gas range.
7. Relative features of gas and electric ranges indicate considerable lack of knowledge:

Ranges	*Gas*	*Elec.*	*Same*	*Don't Know*
Speed of cooking	157	37	15	191
Coolness	19	208	24	149
Cooking results	58	41	64	237
Cleanliness	7	260	29	104
Auto. controls	9	135	27	229
Appearance	14	157	101	128
Length of life	94	34	24	248
Extra features	11	111	30	248
Cost to buy	102	112	14	172
Cost to operate	103	103	9	185

B—Water Heating

1. Approximately 8% have automatic gas water heaters. About 70% have side arm tank heaters of which 35% have furnace coil attachments. 22% using jack pot stoves, etc.
2. Average age of automatic water heaters was found to be 5½ years.
   Average age of side arm tank heaters is 8 years with better than 20% of them more than 10 years old.
3. Approximately 76% thought gas was best for water heating; 13% preferred coal; 4% preferred oil, and 7% would like electric.
4. Almost 70% claimed they had all the hot water they needed.

C—Refrigeration

1. Electric refrigerators showed a 30% saturation, gas refrigeration, 2.5%; ice boxes, 60%; and balance none.
2. Electric refrigerators average 4 years old, gas averaged 2.8 years and ice boxes more than 10 years.
3. As in the case of ranges, the survey indicated customers know very little concerning the relative features of gas and electric refrigeration:

Refrigerators	*Gas*	*Elec.*	*Same*	*Don't Know*
Speed of freezing	10	63	34	293
Silence	28	39	8	225
Food preservation	12	52	79	257
Appearance	8	48	124	220
Length of life	50	46	14	290
Moving parts	49	48	7	296
Extra features	10	47	42	301
Cost to buy	50	65	26	259
Cost to operate	61	63	19	257

D—Automatic House Heating

1. 14% expressed a preference for gas; 8% for electric; 36% for oil; 16% for coal; and 26% don't know or would not buy automatic equipment.

E—Advertising

1. Radio program—56% don't know; 20% don't like it.
   Newspaper advertising—48% haven't noticed or had any opinion; 8% don't like it.
   The *Messenger*, a pamphlet delivered to each customer monthly, very well liked—53% liked this; 31% had not noticed it; 16% offered no opinion.

F—Kitchen Modernization

1. Almost 50% are thinking of modernizing their kitchens.

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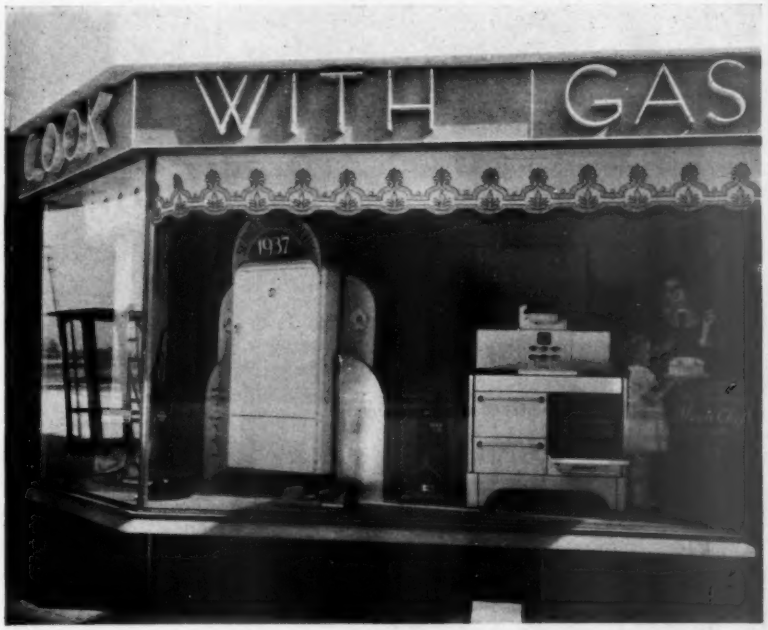
*President, Rochester Gas & Electric Corp., Rochester, N. Y.
Address before Natural Gas Department convention, Kansas City, Mo., May 10-14, 1937.

It is evident from the conditions disclosed by this survey that in Rochester—and I am certain the same is true in other cities—the housewife is decidedly electric-minded and that it will require a well-planned intensive sales and advertising effort and the replacement of old gas equipment with modern appliances if this domestic market is retained for gas. It is also apparent that the public has not been sold on the value of an adequate supply of hot water instantly available.

Gas Service Superior

Extensive studies of the domestic load which have been made recently by the company's rate engineers, not only in Rochester but in many other cities, show that from both the customer and the company standpoint, gas service for cooking and heating—in respect to cost of operation and results obtained—is superior to electricity. These studies have been made on both a pro rata and an increment basis and show that in all ordinary situations the customer can secure this service at a lower cost by using gas as a fuel rather than electricity, with equal or better operating results and in combination companies with equal or better net return to the company. If you are interested in the detail of these studies, I refer you to a recent paper presented by the speaker at the Indiana Gas Association Convention entitled "Economics of the Domestic Load and Consumer Research"; to a paper presented by R. E. Ginna at the last A. G. A. Convention entitled "The Future of the Gas Industry"; and a paper by the same author at the New England meeting in January this year entitled "Appraising Domestic Competition." While these studies were made largely from a manufactured gas standpoint, the results are all the more favorable for gas in those cities and sections where natural gas is distributed because of the lower gas cost.

What then must the industry do to retain the domestic load which it now has and still further increase this business? The answer lies in the selling and research fields. Enjoying as we do advantages over other fuels as to cost and performance, the public should be told these facts over and over again in a manner that will register in their minds. There must be far greater sales effort, more showmanship, more advertising, more man power, more cooperation. The task is one that requires the united effort of every unit of the industry, company, manufacturer and dealer.



In connection with the filming of the R-K-O production, "There Goes My Girl," starring Ann Sothern and Gene Raymond, the above window display in the newly erected gas company office building on the Columbia lot was used. The window was specially dressed for the occasion

Lacking a General Electric or Westinghouse, what these great concerns do individually for the electric industry, the gas companies and the manufacturers of gas equipment and appliances can accomplish by working collectively through the agency of the A. G. A. Member gas companies should support and encourage through their purchasing power those manufacturers who are progressive in their sales, advertising and development programs, and they must be willing to pay a price for appliances which will enable the appliance manufacturers to do a real selling and development job. There has been far too much attention paid to price and not enough to quality. It is easier to sell a good article than a poor one, and what is most important, the buyer will stay sold. On the other hand, the manufacturers must do their part. They should increase their advertising and selling expense; they should continually strive to improve their products as to efficiency of operation, quality of performance, and beauty of design. They must be willing to change—scrap the old for the new.

All of this is a necessary part of the cost of doing business and I am sure that most member companies do recognize and will pay the price that such progressive policy requires. Through increased sales, improved methods, manufacturers should strive to keep costs down for after all society as a whole only benefits as the purchasing power increases.

More Research Needed

The industry needs a much more extensive research program. I like that definition of research which says "Research is trying to find out what you are going to do when you cannot keep on doing what you are doing now." It fits so nicely the present situation the gas industry is in—we must decide what we are going to do because we are pretty generally realizing that we cannot keep on as we have been doing. Research is the life blood of every business today. It is the tool of progress and any industry that fails to use this tool, that fails to provide for a comprehensive research program, will

be smothered in the dust of the advancing horde.

Ranges and water heaters are susceptible of great improvement, both as to performance and efficiency. They need to be streamlined. I predict that the gas range five years from now will have little resemblance to the range of today. The industry needs a program of Pure Research. In these days of atom smashing, electrons, protons, and all the other minute worlds that go to make matter and energy as modern physics and chemistry are revealing their mysteries to us today, is it fantastic to believe that gas—natural or manufactured—may be the raw material for by-products that will open up new horizons? The establishment of graduate gas research fellowships in the better equipped universities, at a modest annual expense, would provide an effective agency for such a program of Pure Research.

Encouraging Factors

So much for present difficulties and what needs to be done. Let's turn for a moment to the brighter side of the picture. What are the encouraging signs? Foremost, I would list the awakening of the industry to the real situation we are facing. A danger once recognized is half conquered. There is a new spirit in the industry, one of optimism and courage. The National Advertising Campaign in a very large measure is responsible for this awakening. It has improved employee morale, stimulated executives to action, and brought dealer, company and manufacturer closer together. This program and that of the "Mystery Chef" have demonstrated that gas companies can get together in a common cause; that we can do collectively what is impossible individually.

These programs are having their effect upon the public mind and they are bringing valuable by-products such as news stories and movie tie-ins. Manufacturers of appliances have been stimulated to increased sales and advertising effort and several of them are now doing an excellent job of national advertising and sales promotion. Let's be sure we encourage them with our support.

There is a better appreciation of the value and importance of research, both on the part of member companies and the equipment and appliance manufacturers. Under the direction of the domestic and industrial research committees of the Association, the Laboratory has carried forward many important research activities that have resulted in marked improvement in domestic and industrial appliances. Manufacturers are seeing the wisdom and necessity of greater individual research effort and some member companies are doing work which promises much for the future of our industry. The A. G. A. laboratory, under the able direction of Mr. Conner, and the Laboratory Committee is an asset whose value is not thoroughly appreciated by our industry, but I assure you it is the envy of our competitors. It will be a tremendous factor in the industry's future progress.

The fourth article in the series "Your Association—What It Is and What It Offers," discussing various activities of the American Gas Association, will appear in the next issue of the MONTHLY. This issue, which will be the combination July-August number, will be published July 15.

Several state and sectional associations are showing the way. The advertising work of the New England and the Indiana Gas Associations is a fine example. These Associations are planning and directing a cooperative advertising campaign for member companies. The Indiana Association is also undertaking a program of research in connection with Purdue University. All gas associations might well inaugurate similar activities. The combined effort cannot fail to have a pronounced effect upon the public attitude and employee morale.

The very recent establishment of a Home Modernizing and Gas Promotion Bureau as part of the Headquarters activities, fills an important need. New homes are being built by the thousands all over the land and old homes are being made over. If the gas industry is to occupy the place it should in these homes, there must be organized at once a well directed, carefully planned, intensive campaign to secure this business. Old kitchens are being modernized. The Rochester survey shows that half the housewives are interested in improving their kitchen layouts. The gas industry must be prepared to direct and help. What a field this opens up for our Home Service Departments and what a market for new appliances! The time is now—we must act. These, as well as other promotion activities, will be the function of this new Association Bureau.

Other bright spots in the gas picture are a better understanding of the economics of the domestic business on the part of top executives of gas, electric and combination companies; the Gas Building at the New York World's Fair; better dealer cooperation, and everywhere a greater sales effort.

The industry has a brilliant past—what of the future? A start has been made. There must be a continuation, a great enlargement of present beginnings. The domestic market is the battleground, its possession is essential to the future of our industry. Economics, performance are in our favor, but there must be greater sales effort, more showmanship, more advertising, more research, more dealer outlets, better rate structures, more cooperative effort.

The economic future of our industry is sound. Its salvation is in our hands.

Appointed Secretary

W. T. K. BRAUNHOLTZ has been appointed secretary of The Institution of Gas Engineers. Dr. Braunholtz has been technical assistant to the Institution since the beginning of 1935.

Haug Receives Longstreth Medal for Invention

JOHN S. HAUG, consulting gas engineer of the United Engineers and Constructors, Inc., Philadelphia, Pa., has been awarded the Edward Longstreth Medal by The Franklin Institute. The award was made "in consideration of the invention and development of an improved type of mechanical clinkered water gas generator." The presentation of the medal to Mr. Haug was made in connection with the Medal Day Exercises of The Franklin Institute which were held on May 19.

In making the citation it was pointed out that on July 7, 1886 the Committee on Science and The Arts recommended the award of the Elliott Cresson Medal to Professor Thaddeus S. C. Lowe "for his great service to the cause of gas lighting in connection with his water gas process. . . . ." An unusual feature in connection with the award to Mr. Haug is the fact that he is a grandson of Professor Lowe.

Developments in Domestic and Commercial Air Conditioning

By L. A. BICKEL

Chairman, Process and Comfort Air Conditioning Committee, Industrial Gas Section

WE gas men have been spoiled! We have a "natural" when it comes to heating, and we seem to expect the same for summer air conditioning. In a sense we *do* have a "natural" for air conditioning because we can produce a superior condition usually much cheaper than any other method.

We have gas-fired dehumidifiers on the market which will do a better and more accurate job of dehumidification than any other known method. We have automatic gas engines for driving refrigeration compressors that will operate *much* cheaper than electric motors with the added advantage of modulated speed control, allowing the engine to operate at exactly whatever speed is required to meet existing load conditions. This point of speed control should *not* be overlooked for it is a definite point of advantage not available in electrically driven compressors.

But those standing by awaiting the development of some simple little summer air conditioning device requiring only a connection to a gas cock to produce "cold" will be disappointed, for there is a fundamental reason just why such a device will never exist. There is no such thing as "cold"—it is merely a word to express the effect of *absence* of heat. Heat is a form of energy and may be *added* to a substance by any one of several methods—in our instance by a chemical reaction—combustion. To produce the sensation of "cold," then, it is necessary that heat be *removed*. There are several methods by which this can be accomplished, the more common of which are: (1) The melting of ice, which process requires the addition of heat with the subsequent lowering of temperature of the substance furnishing the heat; (2) the evaporation of water, which also requires heat; (3) the removal of heat by means of circulating air or water at a cooler temperature than the substance from which it is being removed; and (4) the use of a mechanical refrigeration device which is simply a "heat pump" transferring the heat from one place to another. In all instances the heat removed from the "cooled" area must be disposed of somewhere.

For example, the heat removed from the box of any mechanical kitchen refrigerator, whether gas or electric, is dissipated from the condenser coils into the room in which it is located. For larger equipment this heat is usually carried away by water which may either be wasted to the sewer or recooled by a cooling tower and used over again. The point is, where cooling is to be done, there must *always* be a means of *removing* the heat instead of adding "cold."

Summer air conditioning, however, involves more than solely cooling the air. It is equally important that the air be dehumidified. This very important function of drying may be accomplished by either cooling the air to such a low point that the required amount of moisture drops out, or by use of an adsorption type dehumidifier such as the Silica Gel unit. The most economical method to use depends on several factors determined by local conditions.

Dependable gas-fired equipment is now available to produce cooling and

Year 'round air conditioning of the above residence is accomplished with gas equipment. At right is the Waukesha gas engine installation

Presented at Natural Gas Department Convention, Kansas City, Mo., May 10-14, 1937.

dehumidification for summer air conditioning by either of these three combinations of equipment:

(1) Adsorption type dehumidifier (Silica Gel) and where cold tap water (below 70°) is available in the hottest weather at a reasonable cost, the dehumidified air can be passed over coils through which the cold water is flowing. This is a simple type installation and will produce a highly satisfactory condition with a minimum amount of equipment. Its use, however, is limited to those sections of the country in which there is available tap water of suitable temperatures and cost. These sections include New England, parts of the Great Lakes region, some parts of the Middle West, and a few isolated localities. Generally speaking, it cannot be used to advantage in the South, Southwest, nor most of the Middle West. (Process and industrial air conditioning is excepted from this statement. It will be dealt with later.)

(2) Adsorption type dehumidifier and gas-engine-powered refrigerating unit for cooling. This combination will produce the kind of conditions that all air conditioning engineers dream of. Any desired condition may be accurately maintained under practically any set of local conditions. The initial cost of such an installation is, however, slightly higher than most conventional installations.

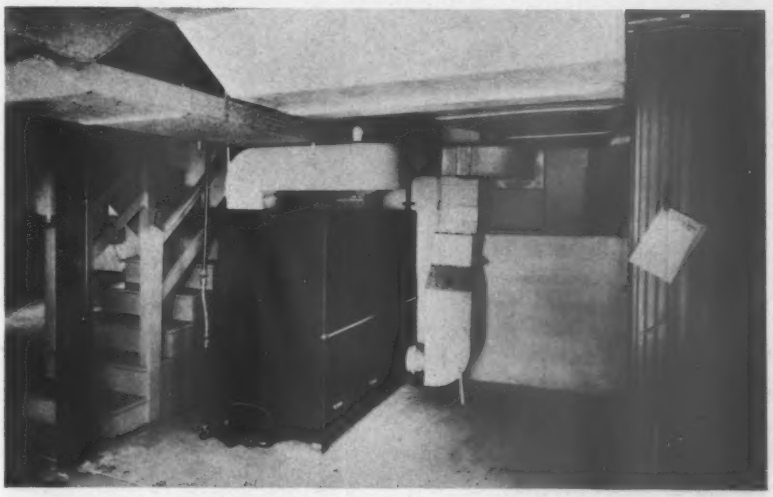
(3) Gas-engine-powered refrigerating compressor unit for both dehumidification and cooling. At the present time this type installation is the most suitable gas burning equipment available for use in the South, Southwest, and most of the Middle West, in fact, wherever mechanical cooling is required, and where cheap natural gas is available. Fortunately, the localities which offer the greatest market for comfort cooling have both these requirements.

Adsorption Type Dehumidifiers

During the year 1936 and the first three months of 1937 there was recorded remarkable progress in the acceptance of gas-operated adsorption type direct dehumidification equipment as applied to the air conditioning field. This is evidenced by the steadily increasing number of such installations.

In 1935 the Bryant Heater Company installed a total of thirty-three units in seventeen states. In the first nine months alone of 1936 ninety-four units were installed in twenty-three states; and the six months' period from September, 1936, to March 15, 1937, has shown a similar increase. In other words, the number of installations has practically tripled each year.

Of significance, too, is the fact that this type equipment is especially adaptable to a variety of industrial processing air conditioning applications where the direct and precise control of the moisture content of air is a major problem, and where little or no cooling is required, except as may be readily accomplished through the use of the natural water supply as available even in the warmest climates. For instance, of the Bryant Silica Gel jobs installed to date, over one-third are for such industrial applications. In the manufacture of everything from pharmaceutical products, pyroxlyn-treated safety glass, film drying, optical goods, to lithographing, printing and oxidizing, gas-operated dehumidifiers have been found to be an essential factor in maintaining production schedules regardless of the weather.



A Bryant dehumidifier installation in a residence at Webster Groves, Mo.

Definitely proven gas-operated equipment for both comfort and industrial dehumidification is available to an enormous market at the lowest cost in the history of its development. Here, in fact, is a means of accomplishing direct dehumidification, using low-cost gas heat energy.

Gas Engine Powered Refrigeration Compressors

Gas engines driving refrigerating compressors can be used to advantage wherever refrigeration is required. This is especially true of the South, Southwest, and Middle West, where the mass market really lies. Here is, truly, the opportunity for real load building.

The gas industry has known for a long time that gas engines will produce power much more cheaply than any other method. It has been only in the last two or three years that we have fully awakened to the possibilities of gas engine power as applied to refrigeration and air conditioning. Undoubtedly air conditioning will be the nation's next great business and the field opened to this use will be tremendous.

Operating Economy

As an example of the operating economy afforded by the use of gas engines instead of electric motors, we will assume that 1,000 cu.ft. of 1,000 B.t.u. natural gas sells for fifty cents. This 1,000 cu.ft. of gas will produce the equivalent of 70 kw.hr. of electrical energy, or at the equivalent rate of seven mills per kw.hr. If purchased electrical energy sells for three cents per kw.hr., then the gas engine will operate for less than one-fourth this cost. So air conditioning a normal eight room house in the South during a summer month with electricity would require approximately 2,500 kw.hr. and would cost $75 as compared to $20 with a gas engine. This means that summer air conditioning is as cheap as winter heating and should mean the difference between just a few plants and a mass market. Surely such an operating cost differentiation will produce a greater outlet to the manufacturers of air conditioning equipment

as well as to gas sales for gas companies.

Low operating cost is not the only advantage of gas engines over electrically driven equipment—flexibility of speed control is a most important factor, especially in the precise control of relative humidity. The economical speeds of an electric motor are limited, while a gas engine can be operated at an unlimited number of speeds equally efficient. For example, the speed of a gas engine can be controlled by the evaporator coil temperature, assuring constant relative humidity as well as operating at whatever speed is necessary to meet exactly the actual load requirements. The usual electrically driven plant has to by-pass part of the load, resulting in a loss of efficiency, or else must cut off completely when the load conditions are satisfied causing the relative humidity to increase noticeably.

"Ice Engine"

In 1935 the Waukesha Motor Company developed the gas engine compressor unit known as the "Ice Engine." Several were installed on railroad coaches for trial, using propane or "bottled gas" for fuel. They proved such a success that seventy-two railroad coaches were equipped with them in 1936, and over four hundred of them have been contracted for this year. The story of the hardships of weather extremes that these units must meet is already well known and the fact that they effectively met all conditions is attested to by the tremendous increase in orders received, both from old customers who tried the first units, and from new customers who have abandoned other types of coach cooling equipment in favor of the gas-operated units.

Using the railroad type Ice Engine design as a basis, the Commercial Ice Engine was developed, differing from the railroad Ice Engine to the extent that is was mounted in a sound absorbing cabinet. Likewise this unit had a rated capacity of seven tons and was built in only the one size. This unit was first offered for sale in the spring of 1936, and units were installed in Houston, Dallas, Tulsa, Kansas City, Chicago, and a large number of other places.

While the operation of these plants during the 1936 season was uniformly satisfactory it was discovered that few gas companies possessed an engineering organization having experience in the highly specialized field of air conditioning. It was further found that the sale of compressor units in conjunction with the engine placed the gas companies in most localities in direct competition with existing established air conditioning organizations. These same organizations evidenced a definite desire to purchase only an automatic power unit with which to replace the electric motor. Such a power unit, it was shown, could also be used on an existing electric powered system by simply removing the electric motor and replacing it with the automatic gas engine unit.

With these facts in mind, Waukesha, this year, developed the De Luxe automatic power unit, which is now available for loads from 5 H.P. to 30 H.P. The line will be further expanded next year. These units are entirely automatic and are quiet, and can be operated with the same ease and convenience with which the electric motor is operated. They are self-contained in every way—truly a complete package power unit.

Gas Companies and Air Conditioning

Air conditioning is a highly specialized field and installations should be made only by experienced air conditioning engineers. Dehumidifiers and power units constitute a relatively small portion of a complete air conditioning installation, and it may be that the most logical approach for most gas companies is to cooperate with existing established air conditioning organizations in the sale and installation of these units. The sales policy, however, is a matter that must be determined by the management of individual companies.

Both dehumidifiers and automatic power units are now developed to a point where they can be offered with confidence and can be expected to perform in accordance with the manufacturer's rating. Both are on display at this convention and every gas man present owes it to himself to visit the displays and familiarize himself with the fine gas-fired equipment now available for our use.

Now—for your part in this picture—what can you do to promote gas-fired air conditioning? The first thing to be done is to air condition one or more of your own offices or display spaces. Without this you are certainly in no position to attempt to influence anybody toward gas-fired air conditioning. I dare say that there is not a company represented here today that could not at least air condition one office or display space this year. I will cause no embarrassment by asking for a show of hands of those already having gas-fired air conditioning plants, but next year I hope the question will be asked, and I further hope that the members present at this convention will have become sufficiently alive to the possibilities of gas-fired air conditioning as a means to promoting the gas business, that all hands may be raised.

Gas-fired air conditioning is the next major promotional activity of the industry.—What are *you* going to do about it?

Merton C. Robbins

MERTON COVEY ROBBINS, chairman of the Robbins Publishing Company, New York City, died May 20. He was 62 years old.

After starting as western representative of *Engineering News* in 1899, Mr. Robbins' rise was rapid. By 1910 he was general manager of *Iron Age*, a position which he held for eight years. In 1918 he started in the publishing business for himself, purchasing Gas Age and Brown's Directory of American Gas Companies. With these publications he founded the Robbins Publishing Company which, in the intervening years, has branched out into other fields until it now publishes *Advertising & Selling, American Perfumer, American Printer, Gas Age-Record & Natural Gas, Gas Appliance Merchandising, Industrial Gas,* and *Brown's Directory of American Gas Companies.*

Mr. Robbins was actively interested in all of the publishers' associations. While president of the New York Trade Press Association, he wrote a clause into the constitution of that body requiring that publishers supply advertisers with verified circulation information. From this beginning grew the Audit Bureau of Circulations, of which Mr. Robbins was one of the founders. It was he who named that body.

He was president of the New York Business Publishers Association in 1915-16; president of the Associated Business Papers, Inc., in 1920-21; and a director of the National Publishers Association for many years. He was also chairman of the Managing Committee of the Publicity and Advertising Section of the American Gas Association during 1921-1922.

Gas Refrigerator Sales Methods

By W. M. JACOBS

Southern California Gas Company, Los Angeles, Calif.

GAS refrigeration is the "natural" of the gas industry, and doubtless many in the industry have observed the zest and zeal which seem to grip those who become engrossed in merchandising this product. I admit no immunity to this "fever," and probably that is why I find it particularly pleasurable to discuss this general subject. Merchandising gas refrigeration *is* fun, and yet it is serious business on a large scale, and one in which there is still much to be learned and accomplished.

Value of Gas Refrigeration to the Gas Industry

It seems apparent that the industry nationally is taking gas refrigeration quite seriously, and it follows that it is quite needless to recount the advantages of gas refrigeration to the industry, in detail. In review of the high spots, however, emphasis should indeed be placed on the modernity appeal which active promotion of this product provides for the industry. After all, modern is as modern does and there is no properly founded question concerning the gas refrigerator's leadership in the field of performance. The refrigerator itself represents one of the best vehicles for merchandising the entire gas industry to our customers.

In addition, gas refrigeration is an important agent in the promotion of the all-gas home, a field which has heretofore been neglected. In the face of the "complete home electrification" theme song, and the very practical strides already made by such national concerns as Kelvinator, Norge, General Electric, Westinghouse and others in merchandising a "packaged" group of home appliances to the public, it seems that further effort must be made by the gas industry to create a clear public concept of the all-gas kitchen and home.

However, probably the most interesting phase of this consideration is the load value to be gained. It is true that the gas refrigerator, in most parts of the country, operates for less cost than any other automatic refrigerator, and this is of course one of its many selling points. However, subject to variations in climatic conditions, rate structures, and market conditions as affecting sizes and use of refrigerators, the load to be gained from this class of business is material, and possesses an attractive load factor.

Servicing costs have shown a consistently downward trend, which enhances the utility's position to realize net earnings from this class of load.

Table I is of interest, as an indication of this downward trend in servicing costs, for gas refrigerators installed on the Southern California Gas Company's system, over a period of several years. This is due obviously to improvements in design and construction of the refrigerator and in servicing technique, increasing saturation with resulting improvement in servicing efficiencies, and increasing preponderance of air-cooled models.

TABLE 1

Year	Cost per Call Ratio to 1932	Annual Cost per Box Ratio to 1932
1932	$1.00	$1.00
1933	.79	.59
1934	.45	.32
1935	.38	.20
1st 3 mos.—1936	.47	.11

Dealer Sales Plan

(A) ADVANTAGES OF A DEALER PLAN

There is probably more uniformity in thought concerning the value of gas refrigeration to the industry, than there is regarding the most effective methods of merchandising gas refrigeration. The extent to which a dealer organization can be built and used as the principal marketing agency naturally depends upon varying local circumstances. However, the fundamental advantages which are hailed by exponents of an active dealer group could be outlined as follows:

1. Productive ability of dealer forces—at probably less cost than equivalent utility direct sales effort. This cannot be said to be a hard and fast conclusion. However, study and observation of Southern California conditions, where there is a large number of quite active dealer outlets, led to this belief; and current analysis indicates that the utility could not hope to operate a direct selling organization possessing the equivalent sales production capacity demonstrated by this dealer organization.

2. General efficiency of enhanced "harmony." There can be little debate as to the practical advantage gained from cooperation with retailers in promoting the gas refrigerator. It results in profit to the dealers, more "gas-mindedness" on their part, and a greater desire and ability to stage productive sales campaigns.

3. Re-enforcements for the gas "army." On the fair assumption that many gas refrigerator dealer outlets would be selling competitive refrigerators were they not selling gas refrigerators, it follows, in a sense, that each gas refrigerator dealer represents the effectiveness of two dealers. It certainly appears reasonable and of practical moment that, for an area having a substantial number of active or potentially active dealers, more over-all sales results may be achieved by enlisting the aid of dealers and gaining the effectiveness of their selling efforts, than by fighting them as competitors.

(B) AN ELECTROLUX DEALER PLAN

(1) The Dealer Organization

Although undertaken previously on a limited scale in Southern California, an Electrolux dealer organization was actively developed with the advent of the air-cooled model. Dealerships were established in suitable gas appliance outlets, including plumbers, furniture stores, hardware stores, and appliance specialty stores. The motive underlying this plan was to gain a multiplicity of outlets for gas refrigerators: to have so many Electrolux dealers, displays, signs, and so much advertising of gas refrigeration that public opinion and acceptance must feel their influence (in fact, to have more dealers than a non-utility distributing agency would have). This was considered necessary to offset the large number and coverage of dealers selling the many lines of competitive refrigerators.

Presented at Natural Gas Department Convention, Kansas City, Mo., May 10-14, 1937.

In order to effectuate this theory and to insure that the relatively large number of dealers obtained sufficient business in their early life to sustain themselves and expand their activity, the dealer organization was established and trained by utility representatives selected for their specialty ability. They encouraged dealers to employ field canvassing salesmen and crew supervisors; business was "created" in the field, where it had been the custom previously to wait for business to "come in to the store."

Because this method of distribution permits a degree of control and specialty effort by the utility beyond that which is possible in promoting dealer sales of other appliances, and because it is believed that this specialty promotion is a factor in the success of this type of dealer activity, the specialty Electrolux dealer contact representatives have been retained by the gas company, separate from its other dealer promotion group.

It is worthy of note in passing that this Electrolux dealer organization served as a nucleus in developing subsequent dealer promotions.

(2) The Electrolux Dealer Agreement

Each dealer established signs an agreement outlining the terms of his "franchise," the principle features of which are outlined below:

(a) Dealers are given "open" territory; no exclusive areas are reserved on the lines of the company.

(b) Dealers are in effect "agents," or sub-dealers; prices and terms are established by the company, and the dealers sell the company contracts, which are immediately turned over to the company.

(c) Company pays dealers substantial commissions on sales.

(d) Company maintains all stocks, and delivers refrigerators to purchasers' premises.

(e) Dealer has the option of installing the refrigerators he sells, according to standard specifications and at a standard flat price. If he does not so elect to make the installations, this will be done by the company.

(f) All servicing after satisfactory installation is done by the company at its expense.

(g) The company takes the necessary practical steps to maintain prices. The dealer agreement clearly defines prices, terms and allowances, and violations are not permitted. Policing is periodically done by "shopping," and similar investigation.

(h) Dealers are not permitted to sell any line of competitive refrigerators.

(i) Refrigerators for display purposes are sold to dealers at special prices and terms; reasonable requirements provide for minimum number of display refrigerators.

(j) Leads for quantity sales of more than a fixed number of refrigerators are referred to the quantity sales department of the company, and the dealer paid a bonus if the sale is made.

(3) Dealer Helps and Promotional Methods

This type of sales distribution both permits and demands a high degree of dealer assistance and promotion. In addition to assistance from the utility's specialty dealer representatives, the following sales aids have become part of the dealer program:

(a) Periodic dealer meetings are held. The speaker, frequently the utility dealer representative or supervisor, occasionally the factory representative or an outside speaker of interest, presents a program that is both interesting and instructive.

(b) Meetings are augmented by periodic bulletins, prepared on a colorful letterhead and written in quite ordinary language.

(c) Campaigns and contests are held periodically, designed whenever possible to possess a purchaser incentive as well as a dealer incentive (a good purchaser incentive is sometimes the best dealer incentive, as well).

(d) Dealers are provided with promotional material, sometimes without cost; window display backgrounds, literature and bill enclosures, and other "sales tools" are included. Each dealer is originally furnished with a set of window "transfer" stickers, announcing "Electrolux" and "authorized dealer." Neon signs of approved type have been financed by the company on liberal terms.

(e) Employee prospect leads for refrigerators are distributed among dealers on an equitable basis, and followed by company representatives to determine effective coverage.

(f) Sales training courses, conducted by well known sales counselors, have been held, the cost being shared by the utility.

Dealer sales promotional features which have been employed recently include the following:

(a) Radio broadcast programs, the utility standing a portion of the cost.

(b) Cooperative advertising.

(c) Theater tie-ins, "bank nights," etc.

(d) Displays and exhibits in all principal shows, fairs, expositions, etc.

(4) Sales Inducements

Both the dealer and company direct sales plans have included the following sales inducements:

(a) Terms: $5.00 down payment on all but the largest model, 36 months' contracts, 6% flat carrying charge.

(b) Favorable trade-in allowances for old ice boxes and electric refrigerators.

(c) Occasional price specials or campaign inducements.

(d) "Clearance" discount on display boxes at the close of the year.

(e) "Combination" appliance sales plan.

This combination plan has proved effective in selling a "group" of appliances. Under the company's regular long-term finance plan, qualified ranges, instantaneous water heaters and storage heaters with copper or monel tanks, are financed on terms up to 60 months. Under the "combination" plan, the period of the refrigerator contract may be extended to 60 months also if sold together with, or within 30 days of such a range or water heater. For the total period that this plan has been in effect (since April 1, 1935), 19% of all refrigerators sold were in "combination." Approximately 95% of the "combinations" included ranges, and 5% automatic water heaters.

The selling appeal of this offer lies in the fact that the monthly payments for the two appliances are about the same as they would otherwise be for the refrigerator alone.

Analysis of Results

Sales, of course, depend upon so many factors that it is quite difficult to attempt to measure accurately the effect of each. Our analyses reflect sales per dealer, sales per 10M. meters, dealers per 10M. meters, company dealer representatives per dealer and per 10M. meters, for the various districts. Similar records are maintained for company direct sales. With consideration given to such factors as market saturation, influence of department store or chain store competition, community purchasing power and habits, it has been apparent that gas refrigerator dealer sales depend markedly upon dealer coverage and company dealer representative coverage. That is, within reasonable limits, greater overall sales may be obtained from a larger number of dealers, and the use of more company dealer representatives per 100

TABLE 2

DEALER SALES-ELECTROLUX

Territory	*Number of Meters*	*Ratio, Sales/10M Meters to Territory of Lowest Sales*	*Ratio, Company Dlr. Reps./100 Dlrs. to Territory of Lowest Sales*	*Ratio, Dealers/10M Meters to Territory of Lowest Sales*
1	61,300	1.0	1.0	1.0*
2	421,700	1.3	1.3	.4
3	3,600	1.6	6.0†	1.4†
4	42,400	1.8	1.5	.9
5	15,200	2.4	1.9	2.0
6	35,900	2.6	2.0	.8‡

* This territory did not yield results to be expected, partially due to high saturation of automatic refrigeration.
† Small territory, results not entirely indicative.
‡ This territory very active, partially due to low saturation of automatics.

dealers results definitely in more sales per dealer and per 10M. meters. These facts appear to justify the principles of multiplicity of outlets and intensive promotional contact with these dealers, and are indicated in the table above:

Direct sales of gas refrigerators by the company have shown moderate but steady gains over several years, but no effort is made to accomplish this at the expense of dealer sales. The compensation plan for company salesmen provides for cooperation with dealers on competitive sales under certain circumstances. Dealer sales have shown more marked increases year after year, and in 1936 approximately 93% of the total retail sales were made by dealers. Each dealer averaged more than twice as many retail sales as did each company salesman, for the year.

Gas Industry To Promote Gas-Equipped Homes

J. F. Quinlan

THE American Gas Association has announced a nation-wide program for the equipment of new homes and the modernization of old ones by the installation of gas appliances. This program will be effective in every city and town in the United States served by gas. It is the belief of the gas industry that the great home building activity which is now going on in the United States will result in the construction of several million new homes, and that these new homes should be equipped with the latest and best in automatic gas equipment.

Part of this nation-wide program will be to demonstrate up-to-date gas-equipped homes to millions of Americans. This will be accomplished in conjunction with hundreds of gas utility companies, gas equipment manufacturers and building material manufacturers. In cooperation with local architects and builders, model homes will be constructed fully equipped with gas appliances so that the American people may see in actual operation the latest and best which the gas equipment industry produces and be informed of the economical services which the utility companies give.

J. F. Quinlan, formerly manager of the nationally known "New American" demonstration home building program, will direct this nation-wide gas industry program and the New Home Service Bureau being set up by the American Gas Association. This program will be supported by the Association in national magazines and local newspapers. Every effort will be made to promote interest in new home construction as well as the modernization of existing homes by the installation of up-to-date gas appliance equipment.

The gas industry will not furnish house plans and will refer all prospects to local architects and local builders. It will establish a service for architects and builders in all matters pertaining to gas appliance installations and through demonstration homes assist in interesting the general public in home construction and modernization.

It is the general belief that homes being built today should be constructed with full consideration to future gas equipment needs, thus eliminating many changes as such necessary equipment is later added. It is thought that by proper display the American people may readily be brought up-to-date regarding the important developments that have been made toward comfort, livability, health, economy, and convenience which gas appliances provide.

This nation-wide program will be carried on vigorously for the benefit of the American public, the building industry and the architectural profession. The American Gas Association will cooperate with the Government and all building material manufacturers and will stimulate nation-wide interest in the construction of new homes built with primary consideration for up-to-date living. Its slogan will be "Comfort, Livability, Economy, Health and Convenience in the American Home."

Executive Conference Resolutions

THE following resolutions were unanimously adopted by the Executive Conference of the American Gas Association in Chicago, May 29, 1937:

Resolved: That the thanks of the Conference is richly due to the Committee on Program, and especially to the discussion leaders who devoted so much time and thought to their contributions to the welfare of the industry.

It is further resolved: That the American Gas Association and the executives of the member companies foster and develop and put into effect at once detailed plans and sales effort to promote increased domestic load in cooking, water heating, refrigeration, and house heating, along the following lines:

1. Advertising and Publicity, both local and national, to demonstrate to the public the greatly increased efficiency and utility of the gas range in competition with other fuels, and to make them mass conscious of the value of gas for such purposes.
2. Concentrated sales effort to introduce modern gas ranges not only for new homes but for replacement purposes as well.
3. Completion and continuation of organization on modern kitchen planning and cooperation with architects and builders on a local and national basis.
4. Development of refrigeration sales to a greater extent than ever before.
5. Development of water heating plans and improvement in application and design of all types of water heaters to meet all conditions.
6. Further development of house heating equipment and air conditioning with the thought in mind of reducing the cost of the equipment to the customer and its application to broaden markets.
7. That prompt efforts be made to analyze competing fuels, costs and supply and equipment with a view of putting the industry in a better position to meet such competition as it arises.
8. To keep up unremitting efforts to make not only the public but the industry itself have confidence that gas is still, and always will be, the modern fuel for domestic, commercial and industrial fuel purposes.
9. That a committee be appointed to coordinate the above promotional activities of the Association and to stimulate greater support of the national advertising campaign among all branches of the industry so that its coverage shall be broadened along the same policies now in effect.

These modern kitchens and basements were put on display recently by the Grand Rapids Gas Light Company, Grand Rapids, Mich., in the company's restyled home service department. The kitchens which are all-gas equipped, are designed for practical use. The basements, shown above, have a handsome iridescent blue-green metal cabinet containing the complete natural gas heating and air conditioning system, with an accompanying hot water storage heater alongside in the same finish

Gas Hydrates in Natural-Gas Pipe Lines[a]

By W. M. DEATON[b]
and
E. M. FROST[c]

U. S. Bureau of Mines, Amarillo, Texas

Introduction

THE Petroleum and Natural Gas Division of the United States Bureau of Mines is studying gas hydrates and their relation to the operation of natural gas pipe lines. The Natural Gas Department of the American Gas Association is cooperating with the Bureau in this work. The study is by no means complete, but some of the findings to date are being presented with the thought that they may be of immediate use to the industry.

Interest in this problem is widespread because the freezing of natural gas pipe lines is not confined to areas of extremely low winter temperatures, but is experienced everywhere that gas is transported under high pressure. The reason for the common occurrence of pipe-line freezing is that natural gas under pressure will combine with water to form solid compounds that resemble ordinary ice but remain solid at temperatures much higher than the normal ice point of 32° F. As many cities and towns with large numbers of domestic patrons are served with natural gas from remote fields, it is imperative that the flow of gas through transmission lines be uninterrupted. Failure of a pipe line to deliver gas for any reason whatever is a condition that cannot be tolerated long.

The general program of the Bureau's study is divided into four phases, as follows:

1. Review of the literature.
2. Field study of the problem.
3. Laboratory investigation of the physical and chemical properties of gas hydrates.
4. Study of methods suitable for preventing or relieving freeze-ups in natural gas pipe lines.

Progress has been made on each of these phases.

Review of the Literature

Little material regarding gas hydrates has been published. The most outstanding contribution is that of Hammerschmidt, (1, 2)[d] who presented a paper on gas hydrates at the meeting of the Natural Gas Department, American Gas Association, in May 1936. Investigations of gas hydrates were reported by Villard (3) as early as 1888 and by De Forcrand (4) in 1902. Since that time a few articles on gas hydrates have been published, most of them dealing with gases not commonly found in natural gas. Freezing in gas pipe lines at temperatures above 32° F. was referred to by Johnson and Berwald of the Bureau of Mines in 1935 (5) and a paper discussing gas hydrates and their relation to pipe-line operation was presented by one of the writers (6) at the Southwestern Gas Measurement Short Course at Norman, Oklahoma, in April 1936. A discussion of gas hydrates appears in the Chemical Committee Report (7) of the American Gas Association for 1936.

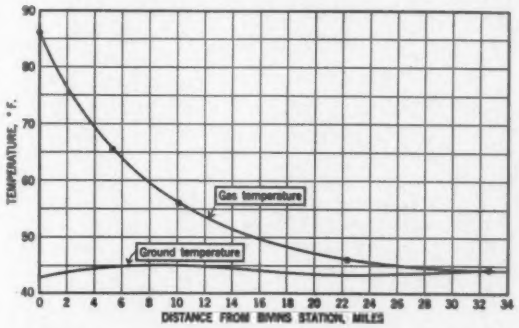


Figure 1. Temperature along pipeline downstream from Bivin's compressor station

Field Study

PIPE-LINE TEMPERATURE SURVEY

Considerable progress has been made in the field study, particularly in the temperature survey which has been under way since January 1936. As mentioned, gas under pressure in association with water will form hydrates at temperatures considerably above 32° F.; in general, the higher the pressure the higher the temperature at which hydrates will form. To determine the possibility of hydrate formation in a pipe line, it is necessary to know both the temperature and pressure of the gas; one is as important as the other. The pressure is easily determined and is usually available from the records of operation, but the temperature of the gas in the pipe line is seldom known. In the Bureau's contact with the industry, it has been observed that usually little information about the temperature prevailing in pipe lines is available. To supply this information, a temperature survey of a representative pipe line was undertaken.

The management of the Amarillo-Denver pipe line, operated in Texas by the Canadian River Gas Co. and in New Mexico and Colorado by the Colorado Interstate Gas Co., offered to cooperate in conducting such a survey. This pipeline system was chosen for study because of its proximity to the Bureau of Mines Laboratory at Amarillo, where the hydrate investigations are being carried on.

The Amarillo-Denver pipe line starts at the Bivins compressor station, about 35 miles northwest of Amarillo, Tex., and extends 340 pipeline miles to Denver, Colo. From Bivins to Pueblo, Colo., it is 22 inches in diameter and from Pueblo to Denver 20 inches in diameter. The gas delivered through this line is gathered from the Texas Panhandle gas field, principally from Moore and Potter Counties. After compression at the Bivins station the gas passes through an oil-absorption gasoline plant and enters the pipe line at a pressure of 300 to 350 pounds per square inch. When it leaves the absorbers, the gas is saturated with water vapor at a temperature of 75° to 90° F. The load on this pipe line ranges from 25 to 85 million cubic feet per day.

In making the temperature survey the Bureau established a number of temperature-measurement stations along the line at selected points as far north as Colorado Springs, Colo., about 270 pipeline miles from the Bivins end of the line. To determine where the gas leaving the compressor station attains ground temperature, stations for measuring the temperature were established at each of the main-line gate valves between the Bivins compressor station and Dalhart, Tex., a distance of 42 miles. These valves are approximately 10 miles apart. One additional station was established at a point 5 miles downstream from Bivins station. Temperature measurements at these stations were made with thermocouples. Figure 1 shows that in this pipe line the gas attains ground temperatures about 30 miles from the compressor station.

Several thermocouples were installed at the temperature station 5 miles downstream from the Bivins compressor station to determine how far from the pipe the ground temperature was affected by the warm gas in the line at this point. The thermocouples were placed in the ground at the depth of the center of the

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Presented before Natural Gas Department convention, Kansas City, Mo., May 10-14, 1937.

[d] The numbers refer to the references at the end of the paper.

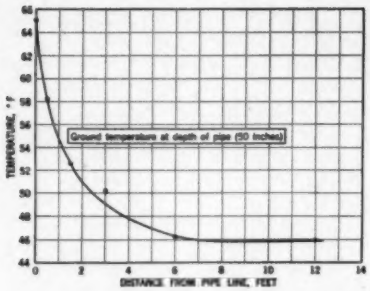


Figure 2. Distribution of underground temperature at right angles to pipe 5 miles downstream from Bivin's compressor station

pipe, which at this location was 50 inches. One thermocouple was attached to the pipe and the others were placed at distances of ½, 1, 1½, 3, 6, and 12 feet from the pipe. Figure 2 shows the distribution of temperature determined by tests at this location.

In addition to the thermocouple installations, 14 recording-thermometer stations were established along the pipe line between Bivins and Colorado Springs. At some of these stations temperatures at several depths were recorded through the use of multiple-pen or a number of single-pen instruments. In making measurements of the gas temperature, a separable thermometer well was placed in the pipe line, which allowed the thermometer bulb to project about 6 inches into the gas stream. Recording thermometers, fully compensated for ambient temperature effects, were used at the more important installations to give an accuracy of plus or minus one-half degree. Where thermometers with uncompensated tubing were used it was necessary to make adjustments from time to time to avoid errors of one degree or more.

To observe the variation of underground temperature with changes in atmospheric temperature, a number of recording thermometers were installed at each of several stations. Figure 3 shows, over a period of nearly a year, the variation of gas temperature and the average daily atmospheric temperature for an installation in an area known as the Black Forest, about 15 miles northeast of Colorado Springs. At this station the center of the pipe is at a depth of 47 inches. The average atmospheric temperature used in Figure 3 is the average of readings at 8 A.M., 3 P.M., and 12 midnight, which was found to agree closely with the average of hourly readings. It will be noted that even though the air temperature varied greatly, the gas temperature remained relatively uniform, changing slowly with the season. The underground temperature at the depth of the center of the pipe line also was recorded at this station, but it agreed so closely with the temperature of the gas that it is not shown as a separate curve. The difference between ground and gas temperature at this point was not more than 1° at any time during the year. This same conformity of gas temperature and ground temperature at the depth of the center of the pipe line was observed at the other temperature-measuring stations where the gas temperature was not influenced unduly by compressor stations, river crossings, or abrupt changes in pipe-line cover.

In addition to the three temperature records mentioned above, ground temperatures at depths of 6 and 18 inches also were recorded at this Black Forest station. Figure 4 shows the variations of underground and atmospheric temperatures on an enlarged time scale. It will be noted that changes in the gas temperature lagged 3 to 5 days behind the corresponding changes in atmospheric temperature and that daily fluctuations in the gas temperature are entirely absent. This lag is typical of observations made at other points along the line. The time lag in the response of underground temperatures to changes in atmospheric temperature should be emphasized; although it is commonly recognized that a lag exists, its magnitude frequently is poorly "guessed at."

At the Arkansas River crossing near Pueblo, recording thermometers were installed in the pipe line on either side of the river. Here the 22-inch line divides into six 10-inch, 900-foot runs laid on the river bottom. The normal change in gas temperature in crossing the river is about 2° F. throughout the year. The results of a test made in February 1937 may be of interest. At the time of this test the river water was at 32° F. and was flowing full of ice. The gas temperature dropped from 42° to 40° F. The gas flow was 42 million cubic feet per day and the line pressure at this point was 152 pounds per square inch.

This temperature survey shows that the gas temperature at any given location is relatively uniform. It changes slowly with the season but does not respond appreciably to temporary weather changes. Unless affected by compressor stations or other disturbing influences, the gas temperature is essentially the same as ground temperature at the depth of the center of the pipe line; hence, it is affected by the depth to which the line is laid. The gas temperature varies along the line in accordance with the seasonal atmospheric temperature of the region traversed. Whether the pipe-line temperatures are influenced greatly by the moisture content of the soil has not yet been determined in these tests. It may be expected, however, that regardless of any change in moisture content of the soil, the underground and the pipe-line temperatures will respond alike and continue to maintain equality.

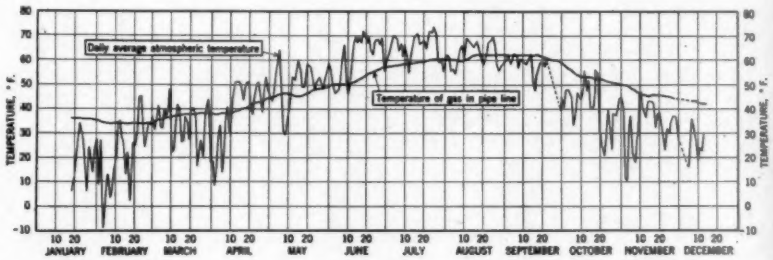

Daily average atmospheric temperature
Temperature of gas in pipe line
TEMPERATURE, °F.
JANUARY FEBRUARY MARCH APRIL MAY JUNE JULY AUGUST SEPTEMBER OCTOBER NOVEMBER DECEMBER

Figure 3. Variation of atmospheric and pipeline temperature at Black Forest Thermometer station

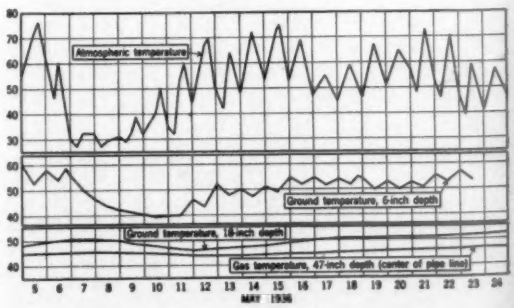

Atmospheric temperature
Ground temperature, 6-inch depth
Ground temperature, 18-inch depth
Gas temperature, 47-inch depth (center of pipe line)
MAY 1936

Figure 4. Atmospheric, ground, and gas temperature at Black Forest thermometer station

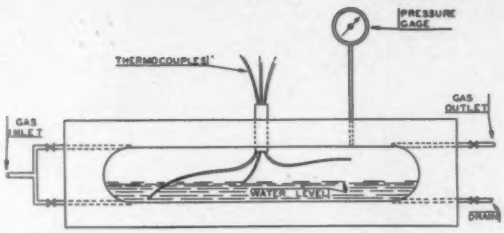


Figure 5. Apparatus for laboratory study of gas hydrates; glass-windowed high-pressure cell

As the formation of gas hydrates is influenced by both temperature and pressure, the need for reliable pipe-line temperature information is apparent. Thermometers placed at intervals of 30 to 40 miles along a line are desirable. In conducting this temperature survey, it was found that the temperatures of the gas measured in thermometer wells placed in the line and temperatures of the pipe registered by thermocouples in contact with the pipe line agreed within the precision of measurement, about ½° F.; hence, any method by which the temperature of the pipe can be measured will be satisfactory. The gas temperature can be estimated with reasonable accuracy by measuring the ground temperature at a depth corresponding to the center of the pipe line. In some cases this may be easier than measuring the temperature of the gas pipe or the gas directly.

In measuring underground temperatures the Bureau has used thermocouples mounted on wood staffs. A 1½-inch-diameter earth auger was used to drill a hole to the desired depth. The thermocouple staff then was placed in the hole and the temperature read after enough time was allowed for temperature equilibrium to become established. In later tests a mercury-in-glass thermometer mounted on the lower end of a staff was used, precaution being taken to read the thermometer quickly after withdrawal from the hole. With proper precaution this provides an inexpensive and convenient means of ascertaining underground temperatures.

Laboratory Data

In conducting the laboratory investigations of gas hydrates, methods and equipment were chosen which would give results directly comparable with the formation of hydrates in pipe lines without sacrificing precision and accuracy. Equipment of other design was used in certain preliminary phases of the work, but the results here reported were obtained with the apparatus illustrated in Figure 5 and described below.

The main body of the apparatus consists of a glass-windowed high-pressure cell having internal dimensions of 1 by 1¼ by 6 inches. The unit is made from a Jerguson, type P, high-pressure, liquid-level gage. The windows in the gage are plate glass, approximately ¾ inch thick, suitable for withstanding high pressure. The apparatus used in this investigation withstood a hydrostatic-pressure test of 2,500 pounds per square inch. This type of cell was considered to be better than one of high-pressure glass tubing, because the plate-glass windows permit the interior to be observed without distortion. Flow of gas through the apparatus is controlled by suitable valves. The cell can be oscillated about a horizontal axis, but usually it is operated in an approximately horizontal position. Connections in both the bottom and the top controlled by suitable valves allow the gas to be bubbled up through water in the cell or to flow across the surface of the water as desired.

The cell is placed in a thermostated bath equipped with plate-glass windows and a suitable lighting system for visual observation. The temperature of the bath is controlled to plus or minus 0.05° F., and temperatures in the bath and cell are measured to the same accuracy by thermocouples and a high-sensitivity potentiometer. To measure temperatures within the cell, three thermocouples are placed inside—one junction at the bottom and normally in the water, the second in the middle in contact with the water surface, and the third in the gas space in the upper part of the cell. A fourth thermocouple is placed in the bath to determine its temperature, permitting convenient comparison of temperatures within the cell and the bath.

Confirming Hammerschmidt's (1, 2) results, the writers have found that until crystallization has been started it sometimes is difficult to get the hydrates to form even at pressures 300 or 400 pounds per square inch in excess of that at which they will form when crystals are present. Although this behavior has been demonstrated repeatedly, it probably offers no advantage in the operation of pipe lines because the phenomenon is transitory and there is no assurance that the liquid in the line will not become inoculated in time with hydrate. When this occurs, hydrates will form at pressures only slightly higher than those at which they decompose.

A dynamic method is used for determining curves of hydrate decomposition like those shown in Figure 6. At a selected bath temperature the apparatus, containing gas under pressure and some liquid water, is manipulated to form crystals of hydrate. This usually is accomplished by reducing the pressure within the cell rapidly, thus producing local cooling. After hydrate crystals are observed to be present, the pressure in the apparatus is maintained for a time at a value estimated or known to be higher than the decomposition pressure for the selected temperature. Gas is allowed to flow through the apparatus across the surface of the water until the water freezes over with hydrate. The pressure regulator used to control the pressure in the cell then is manipulated to reduce the pressure slowly. After a trial or two, the decomposition pressure can be estimated within a few pounds; and a careful check is made in this range of pressure. By having only a thin film of hydrate ice on the water surface, it is possible to check the pressure at which the hydrate decomposes within 1 or 2 pounds per square inch.

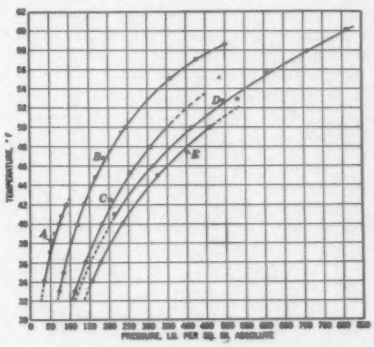


Figure 6. Curves for decomposition of gas hydrates: A, Propane (83.4 per cent pure); B, ethane (93.6 per cent pure); C, natural gas, Canadian River Gas Co.; D, natural gas, Hammerschmidt's curve; E, natural gas, Cliffside field

The depressuring method of determining the hydrate-decomposition curves has been checked by the alternate method of holding the pressure constant and raising the temperature of the bath. Data obtained by this method conform to those obtained by dropping the gas pressure at constant temperature. As reduction in pressure is more readily accomplished, the depressuring method generally is used.

Figure 6 shows hydrate-decomposition curves for ethane, propane and two natural gases. In addition, Hammerschmidt's (1, 2) curve for another natural gas is shown for comparison. It will be observed that each natural gas has a distinctive curve. The analyses of the gases used in determining these several curves are shown in Table 1. The purity of the ethane and propane used was not very high, as the analyses show, and caution should be exercised in using the curves for these two gases. They are presented primarily to afford comparison with the

TABLE 1

ANALYSES OF GASES USED IN OBTAINING CURVES OF FIG. 6

	Ethane	*Propane*	*Natural Gases*		
	A	B	C	D	E
Constituent					
CO_2	Nil		0.2	0.2	0.8
N_2 Residue		4.22	14.3	7.19	25.0
CH_4	2.6		75.16	82.50	67.4
C_2H_6	93.6	12.41	5.95	5.99	2.7
C_3H_6	3.8				
C_3H_8		83.37	3.33	3.26	1.9
C_4H_{10} (iso)			1.06	.30	1.2
C_4H_{10} (normal)				.49	
C_5H_{10} +				.07	

hydrate curves of natural gases containing many components. More data must be obtained before spacing of the curves can be correlated definitely with gas composition.

In making the hydrate tests it has been observed that although most of the hydrate decomposes readily when the pressure in the cell is reduced at constant temperature, a small, indefinite amount of hydrate persists for a considerable time, even after the pressure is reduced to atmospheric. This hydrate which fails to decompose either is submerged in the water in the cell or completely covered by a water film. The temperature of the water, as indicated by the thermocouples within the cell, usually is not more than a few tenths of a degree lower than the bath temperature.

This hydrate persistence is mentioned as a matter of interest, but no conclusive explanation can be offered at this time. It may be comparable to the persistence of hydrate in pipe lines that have been fully depressured. It is to be noted, however, that so far as the writers have determined, hydrate removed from pipe lines has a temperature of 32° F. or lower, even though it is definitely known that the hydrate was formed in the line at considerably warmer temperatures. It seems likely that as the hydrate in the line starts to decompose it absorbs heat from itself, thus lowering its temperature; this reduction in temperature continues until the normal ice temperature is reached, at which time the water released by decomposition of the hydrate is frozen into water ice. This explanation would account for the relative stability of the hydrate mass at a pressure of 1 atmosphere. Further investigation of this phenomenon is contemplated.

In the laboratory experiments the hydrate is observed to accumulate on the surface of the water. As gas is passed over a water surface, hydrates form as a scum over the entire surface; then the formation ceases or at least proceeds very slowly. If the gas is bubbled through the water, the bubble surface is transformed into a film of hydrate. This observation suggests that the formation of hydrate is a surface reaction.

It is of considerable importance to know whether the hydrate reaction will take place in the gas phase. If the reaction is confined to water surfaces, this would not be possible. It is planned to investigate this question more thoroughly.

Remedial Measures

As water is necessary to the formation of gas hydrates, an obvious means of eliminating hydrate formation is to remove all water from the pipe line and then dry all gas that enters the line. If hydrates will form only where liquid water is present, it would be necessary only to dry the gas to a point where its dew point is lower than the temperature in the pipe line. This would not necessarily eliminate all danger of trouble from freezing in regulators because the local cooling resulting from expansion may reduce the gas to a temperature lower than the dew point of the gas, thus condensing water and permitting hydrates to form.

Several gas companies are removing the water from the gas at their initial compressor stations. An absorption system using refrigerated calcium chloride brine commonly is used. In two recent installations diethylene glycol is employed. Glycerine has been used, but reports indicate that some difficulty was encountered due to decomposition or oxidation of the glycerine to a less hygroscopic material.

In systems using a liquid for absorption of water vapor the solution is circulated over a bubble tower through which the gas passes. The solution is regenerated by diverting a part of the circulating liquid to to an evaporator where it is concentrated and then is reintroduced into the cycle; or as in the case of diethylene glycol, the entire circulating solution is passed through a still where the water is removed by distillation.

Other processes of removing water from gases employ silica gel, activated alumina, and charcoal. These are adsorptive materials and tend to remove gasoline vapors as well as water vapor. As the adsorptive materials must be regenerated at intervals, processes using them are intermittent, and it is necessary to have multiple-unit installations so some units can be used for adsorption while others are being regenerated.

Many gas transmission lines are operated without removing water from the gas, except by condensation in the pipe line. Such lines are confronted with the possibility that hydrates will accumulate in the line if the temperature and pressure are conducive to their formation. When freezing occurs, it is necessary to employ some means for relieving the freeze-up. A number of methods are in common use. As the formation of hydrates is similar to the freezing of ice, some means of heating the line naturally suggests itself. To do this, the line is uncovered and heat applied. Sometimes fires are built in the trench using combustible materials that are readily available. This method is effective if the freeze can be located exactly and the heat applied at the point of freezing. Frequently, however, the freeze-up is so complete that only a small flow of gas is maintained; hence, a relatively small amount of heat is carried to the point of plugging.

Another method commonly used is to put alcohol into the line with the hope that it will be carried to the point of plugging where it will decompose the hydrate. This method also requires that the plug be located fairly exactly and depends upon a sufficient gas flow to carry the alcohol to the plug. A third method is to lower the pressure in the section of line which contains the freeze-up. During the reduction in pressure the hydrate decomposes, at least partly, so the plug is broken. Although all these methods are effective to some extent, the depressuring method seems to offer the greatest promise of success where its use is practicable and the temperature of the pipe line is above 32° F.

Depressuring Method

The depressuring method was tried with excellent results following a freeze-up in January, 1936, in the Colorado Springs 8-inch lateral off the Amarillo-Denver line. In this case, the pressure in the lateral was lowered by closing the gate at the main line and allowing the city demand to reduce the pressure. As soon as the pressure in the lateral reached 100 pounds per square inch, the lateral gate at the main line was partly opened and manually operated to keep the pressure from dropping further. The line was operated under these conditions for a period of about 48 hours. Full pressure then was restored to the line. Upon resumption of normal operation, the plug was observed to be entirely gone; in fact, the pressure-drop record between the main line and the city-border station showed that the plug had been relieved considerably by the time the pressure reached 125 pounds per square inch. The exact temperature in the lateral was not known, but it was estimated to be about 37° F. Referring to the curve for the Canadian River gas, which supplies this line (Figure 6), it will be observed that at 37° decomposition takes place at a pressure of 150 pounds per square inch absolute; and the decomposition

(Continued on page 238)

Personal and Otherwise

Southern California Companies Merge

A. B. Macbeth

Addison B. Day

A DEVELOPMENT of major importance to Southern California customers and gas service people alike, was the consolidation on May 13 of the Los Angeles Gas and Electric Corporation and the Southern California Gas Company under the name of the latter company. Authority to exchange the common and preferred stock of the Los Angeles company for an equal stock interest in the Southern California Gas Company, and to merge the properties and service facilities of the two organizations, was granted by the California Railroad Commission in April. Consent of considerably more than the required two-thirds majority of each class of outstanding stock was given by shareholders on May 11; and the officers and directors of the new company began their duties on May 13, following the filing of the merger agreement and certificate of approval with the California Secretary of State.

The chief immediate benefit of the merger, insofar as the public is concerned, is the simplification and unification of natural gas service to over two million customers in Southern California. Historically, the Southern California Gas Company was established as a competitor to the Los Angeles Gas and Electric Corporation, and the operations of the two companies in certain sections of the City of Los Angeles were parallel. In other sections, overlapping facilities resulted in confusion to the customer. This condition was mitigated to a certain extent by affiliation of the two companies through the Pacific Lighting system in 1929.

The present merger brings 650,000 active meters into a single integrated system, and provides uniform natural gas service for the cities of Los Angeles, Pasadena, South Pasadena, Alhambra, Huntington Park, Inglewood, Beverly Hills, Glendale, Burbank and contiguous territory around Los Angeles. Outside of Los Angeles County, the Southern California Gas Company serves natural gas in Riverside, San Bernardino, Kern, Kings, Tulare, and Fresno Counties.

In the physical consolidation, which was largely completed by June 1, the managements effort was to preserve as far as possible the personnel structure of the former companies. Increase in business and normal retirements under the pension plan of the systems made it possible to effect the merger without a reduction in force, and it is expected that this policy will be maintained.

Officers for the new organization were selected from both companies. Addison B. Day, former president and general manager of the Los Angeles Gas and Electric Corporation, becomes Chairman of the Board of Directors, while A. B. Macbeth continues as president and general manager. Mr. Macbeth is a past president of the American Gas Association. H. L. Masser, Los Angeles Gas and Electric vice-president and assistant general manager, becomes executive vice-president. LeRoy M. Edwards, general counsel for the Los Angeles Company, serves as vice-president and special counsel; and T. J. Reynolds, continues as vice-president and general counsel. William Moeller, Jr., continues as vice-president in charge of natural gas production and transmission. F. M. Banks becomes vice-president in charge of sales, advertising and customers.

Other vice-presidents include F. J. Schafer in charge of distribution and manufacture, W. E. Houghton in charge of treasury, and R. W. Miller.

Maynard H. Spear Dies

MAYNARD H. SPEAR, who was associated with the Consolidated Edison Company of New York, Inc., for many years, died May 19.

Mr. Spear was president of the New York and Queens Gas Company from 1928 until June, 1936, when the company was merged into Consolidated Edison. Since then he has been manager of the Queens district of the company.

He was born in Brooklyn, N. Y., on March 29, 1874, and attended Brooklyn Polytechnic Institute and Stevens Institute of Technology.

His first job was with the Bayonne Chemical Works, specializing in the manufacture of nitric and sulphuric acids for the production of nitro-glycerine. In 1896 he entered the employ of The Standard Gas Light Company of the City of New York as foreman, staying there until 1899 when he went with the Hornell Gas Light Company, at Hornell, N. Y. In 1902 he became superintendent of the Newtown and Flushing Gas Company at Flushing, which was merged with the New York and Queens Gas Company in 1904. In 1906 he became manager of the company, in 1908 secretary and general manager, in 1920 vice-president, in 1924 a director, and in 1928 president.

Mr. Spear was a member of the Society of Gas Lighting, the Society of Gas Engineering, a past president of the Society of Gas and Electric Accountants; a member of the American Society of Mechanical Engineers and the American Gas Association.

Hawley Elected Director of U. S. Chamber

GEORGE S. HAWLEY, president of the Bridgeport Gas Light Company, Bridgeport, Conn., and a director of the American Gas Association, was elected a director to the board of the Chamber of Commerce of the United States at its recent twenty-fifth annual meeting. Mr. Hawley will serve a two-year term.

Establishes 64-Year Service Record

Edward Olsen

A RECORD of long service seldom, if ever, equalled has been established by Edward Olsen, head of the meter installation and customer's service department of the Citizens Gas and Coke Utility, Indianapolis, Indiana. Mr. Olsen recently completed his sixty-fourth year of continuous service with the company.

"Pop" Olsen is 83 years of age, in remarkably good health, and still active. He has served under five managers and has seen the number of meters in Indianapolis increase from 3,000 in the days when he personally answered all fire alarms to more than 80,000.

On April 7 Mr. and Mrs. Olsen celebrated their golden wedding anniversary.

N. Henry Gellert Heads New Holding Company

N. H. Gellert

THE Great Lakes Utility Company, a new holding company, has taken over all the subsidiaries formerly owned by the Great Lakes Utilities Corporation, which was reorganized in Federal Court. The company has acquired the following subsidiaries of the old corporation: Ohio Gas Light and Coke Co., Gas Corporation of Michigan, Rochelle Gas Co., Paxton Gas Co., Independance Gas Co., Peoples Gas and Power Co., LeMars Gas Co., Watertown Gas Co., Virginia Gas and Utilities Co., and Martinsville Gas Co.

The contract for the operation of these properties has been awarded to Day & Zimmerman, Inc.

N. Henry Gellert has been elected president of the holding company. He is a graduate of Yale College, with a degree of Bachelor of Arts. He also holds a degree of Bachelor of Philosophy in Civil Engineering in the Sheffield Scientific School of Yale University and a graduate degree of Civil Engineer in the same school.

For many years Mr. Gellert has been an active executive of gas properties in the east and mid-west. He was also chief engineer of the construction of the gas plant in San Juan, Puerto Rico. He designed and built the first electrical blast furnace gas cleaners to operate in the United States.

He was vice-chairman of the Code Committee in the manufactured gas industry and has been active in American Gas Association affairs.

Elected Vice-President

L. B. Eichengreen

LEON B. EICHENGREEN was elected a vice-president of the Philadelphia Electric Company, at a recent meeting of the Board of Directors. He will be in charge of activities in connection with the gas properties of the company.

Mr. Eichengreen was graduated from the University of Pennsylvania as a mechanical engineer in 1908. He entered the employ of The United Gas Improvement Company in March, 1909, where he held positions, successively, of illuminating engineer, operating engineer and general superintendent of gas operations. He became identified with the Philadelphia Electric Company in August, 1928, as manager of the gas department. Since 1931 he has occupied the position of assistant to the vice-president in charge of engineering, as head of the gas engineering department.

Mr. Eichengreen is a vice-president of the Pennsylvania Gas Association and a member of the American Gas Association, the Engineers' Club, Penn Athletic Club and St. David's Golf Club. He is a resident of St. Davids.

New Laclede Officers

J. B. Wilson

J. B. WILSON, engineer and utility executive, was elected president of The Laclede Gas Light Company, St. Louis, Mo., by the new Laclede board. He assumed the duties of this office on May 10.

Mr. Wilson began his career 25 years ago as power sales engineer for St. Joseph Light, Heat and Power Company. He was later president of the Coast Counties Gas and Electric Company in California and goes to St. Louis from the Middle West Service Company, which operates in Missouri, Kansas, Oklahoma, and Texas.

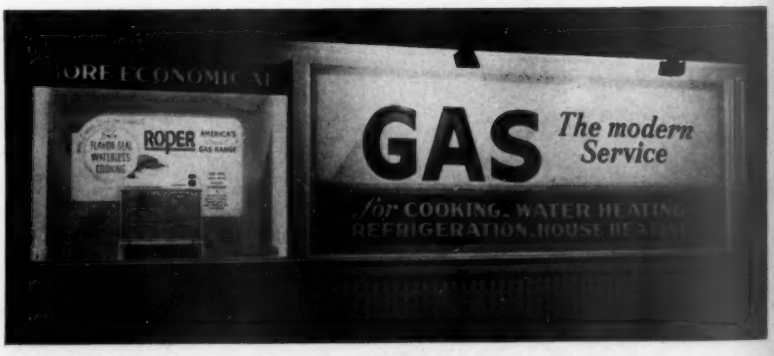
Ben F. Pickard, who has been executive head since December, when Edward P. Gosling resigned as president, was elected operating vice-president. Other officers elected are: John Duncan, vice-president; E. L. White, secretary and treasurer; and Alfred Hirsh, assistant secretary and treasurer.

Gas House Heating Gains

USE of gas for heating homes increased substantially in 1936, the annual report of Public Service Corporation of New Jersey and subsidiary companies just released to stockholders reveals. During the year 1,573 gas-fired building heating installations were sold, more than in any previous year, and a gain of 763 over 1935.

More than 4,900 homes and other buildings in Public Service territory were heated with gas on December 31, 1936.

Billboard Serves Dual Purpose



This modern attractive billboard of the Citizens Gas Company, Stroudsburg, Pa., combines the advantages of outdoor advertising with the utility of a display window. A glass-fronted merchandise display compartment is built in as an integral part of the billboard. According to Ralph H. Fry, division manager, the sign has been erected in the center of the company's distribution system where it is estimated that from 65 to 70 per cent of the population of that area pass it at least once a week. It is so arranged that the display can be changed periodically to tie in with whatever campaign the company wishes to promote

Affiliated Association Activities

Pennsylvania Gas Association

H. S. Christman

THE twenty-ninth annual convention of the Pennsylvania Gas Association held May 4-6 at the Skytop Lodge, Skytop, Pa., attracted one of the largest gatherings on record. Delegates from all sections of the state participated in a lively discussion of the papers presented on distribution, accounting, new business and customer relations problems.

A feature of the opening session was a talk by Alexander Forward, managing director, American Gas Association. E. G. Boyer, general superintendent of gas operation, Philadelphia Electric Company, also addressed this session. H. N. Squier, president of the association presided.

H. S. Christman, The Philadelphia Gas Works Company, Philadelphia, was elected president for the coming year. Other officers elected at the meeting are: First vice-president, E. S. Mench, Williamsport; second vice-president, L. B. Eichengreen, Philadelphia; third vice-president, M. A. Boylan, Scranton; secretary, F. W. Lesley, York; treasurer, W. G. Sterrett, Philadelphia; and managing director, A. B. Millar, Harrisburg.

Indiana Gas Association

H. Carl Wolf

H. C. WOLF, president, Central Indiana Gas Company, Muncie, Indiana, was elected president of the Indiana Gas Association at the twenty-seventh annual convention of the association, held April 28 and 29 in Muncie. At the same time Dean H. Mitchell, Hammond, was elected vice-president, and Paul A. McLeod, Newcastle, secretary-treasurer. The following new directors were elected: H. G. Horstman, Indianapolis; E. G. Peabody, Muncie; E. C. Weston, Terre Haute, and L. B. Smith, Auburn.

Herman Russell, president, American Gas Association, delivered one of the outstanding addresses at the convention. He presented the results of a study made by the Rochester Gas and Electric Corporation, of which he is president, which showed that gas occupies a favorable economic position in most combination companies.

There were 277 present at the meeting, breaking all previous attendance records.

Michigan Gas Association

WALTER C. BECKJORD, vice-president and general manager of Columbia Gas and Electric Corp., will be the principal speaker at the first session of a three-day meeting of the Michigan Gas Association being held July 1-3 at Mackinac Island in conjunction with the Michigan Electric Light Association.

The President's Address by Newell E. Loomis, Detroit, opens the second day's program. This session will also include reports on the Gas Fellowship at the University of Michigan by J. W. Batten, chairman, Technical Committee, and Professor A. H. White, director of research work. Other subjects include: "Acceptance and Metering of Natural Gas" by William Frazer, Detroit; "Production of High B.t.u. Gas" by George Bentley, Detroit; and "Introduction of Natural Gas to Industrial Plants" by William Johnson, Detroit.

The final session, July 3, will be devoted to discussions of the national advertising campaign and national sales

Convention Calendar

JUNE

7-9 **National Office Management Association**
Chicago, Ill.

8-9 **A. G. A. National Conference on Industrial Gas Sales**
Palmer House, Chicago, Ill.

10-11 **Canadian Gas Association**
Chateau Laurier Hotel, Ottawa, Canada

10-11 **New York-New Jersey Regional Gas Sales Conference**
Westchester Country Club, Rye, N. Y.

10-11 **Summer Sales Conference—New England Gas Association**
Swampscott, Mass.

11-16 **International Gas Union**
Paris, France

14-20 **Second World Petroleum Congress**
Paris, France

15-19 **Home Service Training Course, A. G. A. Testing Laboratory**
Cleveland, Ohio

20-23 **Public Utilities Advertising Association**
Hotel Pennsylvania, New York, N. Y.

21-24 **American Home Economics Association**
Kansas City, Mo.

24-25 **Compressed Gas Manufacturers Association**
Seaview Golf Club, Absecon, N. J.

24-26 **American Society of Heating and Ventilating Engineers**
New Ocean House, Swampscott, Mass.

June 28-July 2 **American Society for Testing Materials**
Waldorf Astoria Hotel, New York, N. Y.

JULY

1-3 **Michigan Gas Association**
Grand Hotel, Mackinac Island, Mich.

AUGUST

Pacific Coast Gas Association
Seattle, Wash.

Aug. 31-Sept. 3 **National Association of Railroad and Utilities Commissioners**
Salt Lake City, Utah

SEPTEMBER

6-10 **American Chemical Society**
Rochester, N. Y.

19-23 **American Transit Association**
The Greenbrier Hotel, White Sulphur Springs, W. Va.

23-25 **American Trade Association Executives**
French Lick Springs Hotel, French Lick, Ind.

Wk. 27 **AMERICAN GAS ASSOCIATION**
Cleveland, Ohio

OCTOBER

11-15 **National Safety Council**
Kansas City, Mo.

18-21 **American Society for Metals**
Atlantic City, N. J.

18-23 **American Dietetic Association**
John Marshall Hotel, Richmond, Va.

NOVEMBER

9-12 **American Petroleum Institute**
Stevens Hotel, Chicago, Ill.

10-13 **17th Annual Gas School Conference**
Iowa State College, Ames, Iowa.

DECEMBER

6-7 **National Industrial Council**
Waldorf Astoria Hotel, New York, N. Y.

8-9 **National Association of Manufacturers**
Waldorf Astoria Hotel, New York, N. Y.

contests. Clayton G. Cassidy, Chicago, will speak on the national advertising campaign. The gas range campaign will be presented by L. W. Johnson, chairman, Domestic Range Committee. George S. Jones, Jr., Evansville, will speak on the refrigeration campaign. The Golden Faucet Automatic Gas Water Heater Campaign will be described by R. E. Williams, chairman, of the committee conducting this contest.

An excellent entertainment program has been arranged for the convention.

Canadian Gas Association

MANY outstanding papers will be presented at the annual convention of the Canadian Gas Association which takes place June 10-11 in Ottawa. A paper of particular significance is to be presented by A. T. Stuart, director, Electrolytic Gas Department, Hydro Electric Power Commission of Ontario, on the subject, "Complete Gasification of Coal with Oxygen." It will cover the first public report of what the Hydro Electric Power Commission of Ontario has been doing the past three or four years in producing cheap oxygen by electricity and how they have carried on extensive experiments in the use of oxygen in gas making from various fuels.

The convention program will also contain many other papers on a wide variety of timely subjects. Headquarters will be at the Chateau Laurier Hotel. Further information can be obtained from the secretary, G. W. Allen, 7 Astley Ave., Toronto 5, Ontario.

Missouri Association of Public Utilities

CHESTER C. SMITH, vice-president of the Kansas City (Mo.) Power and Light Company, was elected president of the Missouri Association of Public Utilities at its annual convention April 21, 22 and 23 in Excelsior Springs, Mo. He succeeds C. E. Michel, vice-president of the Union Electric Light and Power Company, St. Louis, Mo., who has served as president two years.

Other officers elected were: First Vice-President, E. H. Lewis, St. Louis County Gas Company, Webster Groves, Mo.; Second Vice-President, Ben C. Adams, Gas Service Company, Kansas City, Mo.; Third Vice-President, O. F. Funk, Union Electric Light and Power Company, St. Louis, Mo.; Secretary, N. R. Beagle, Missouri Power and Light Company, Jefferson City, Mo.; Treasurer, Hermann Spechrer, Union Electric Light and Power Company, St. Louis, Mo.; Assistant Secretary, Jesse Blythe, Jefferson City, Mo.; Managing Director, E. A. Beer, Jefferson City, Mo.

Wisconsin Utilities Association

C. E. Kohlhepp

C. E. KOHLHEPP, vice-president and treasurer, Wisconsin Public Service Corporation, has been elected president of the Wisconsin Utilities Association for the fiscal year beginning May 1.

Mr. Kohlhepp has been a member of the Association since its organization in 1922, was the first chairman of the Accounting Section and since 1933 has been treasurer of the Association. Currently he is chairman of the Accounting Section, Edison Electric Institute.

Other officers elected for the fiscal year are: Bruno Rahn, Milwaukee Gas Light Company, vice-president; Henry Dropp, Milwaukee Gas Light Company, treasurer. R. M. Hougher, Wisconsin Hydro Electric Company, was elected chairman of the General Section and Howard Cooper, Wisconsin Power and Light Company was named vice-chairman.

P.U.A.A. To Meet in New York

IN connection with the four-day annual convention of the Advertising Federation of America, the Public Utilities Advertising Association is holding a one-day meeting at the Hotel Pennsylvania, New York City, on Tuesday, June 22. The following interesting program has been arranged by Thomas H. Spain, chairman of the Program Committee.

Tuesday Morning, 9:30 O'clock

The State of the Association. President Donald D. Parry, Wilson and Haight, Inc., Hartford, Conn.

The Merchandising Plan Comes First. J. R. Pershall, Public Service Company of No. Illinois, Chicago, Ill.

Making the Best of Catastrophes. Kenneth Magers, Union Gas and Electric Company, Cincinnati, Ohio.

What's Troubling You? A symposium conducted by the president.

Luncheon at 12:15. Address by T. K. Quinn of Maxon, Inc., New York, N. Y.

Afternoon Session, 2:00 P.M.

Who's Being Kidded. Robert E. Ginna, Rochester Gas and Electric Corp., Rochester, N. Y.

Demonstration Homes for Utilities. A symposium conducted by the president.

Reports—

New Advertising Exchange Committee—E. F. Gardiner, Chairman.

Costs and Results Committee—H. J. Rowe, Chairman.

Membership Committee—Henry Obermeyer, Chairman.

Better Copy Contest Committee—Kenneth Magers, Chairman.

Secretary—H. W. Olcott.

Treasurer—H. C. Cannon.

Nominating Committee.

Election of Officers.

McCarter Medal Award

WILLIAM F. McDONOUGH, employee of The Philadelphia Gas Works Company, Philadelphia, was presented with a McCarter medal and certificate on May 18 by C. N. Lauer, president of the company. The award to Mr. McDonough was made for an outstanding act of life saving by the use of the Schafer prone pressure method of resuscitation.

The presentation was made at the President's staff meeting after Mr. McDonough had been introduced by H. D. Lehman, manager of the customers' service department. The citation stated that Mr. McDonough had been dispatched to a house in answer to a leak complaint. Upon his arrival he found a woman overcome by gas. By his prompt application of the prone pressure treatment, he was able to revive her.

Henry Sprague Dies; Gas Meter Inventor

HENRY H. SPRAGUE, founder and chairman of the board of the Sprague Meter Company, Bridgeport, Conn., died May 29 at his home of a heart ailment. He was 79 years old.

Mr. Sprague, a native of Newark, Ohio, was graduated from Yale in 1881.

For a short time he was a surveyor for the first telephone lines in Central Ohio and in 1888 he purchased rights to a gas meter, which he soon discarded as impractical. He then invented one of his own, the first cast-iron meter for artificial gas. In 1890 he set up a two-man plant in Bridgeport. It now employs 200 men. He was a director of the Black Rock Bank and Trust Company since its founding.

Mr. Sprague was a member of the American Gas Association. He was also a member of the Yale and University Clubs of New York and of the Black Rock Yacht Club.

His first wife, the former Rose H. Mueller, died in 1924. In 1930 he married Miss Helen Magness, by whom he had two children, Henry and Jane, who survive, as do Mrs. Sprague and a sister, Miss Mary A. Sprague of Newark, Ohio.

Accounting Section

Herbert E. Cliff, Chairman H. W. Hartman, Secretary E. J. Tucker, Vice-Chairman

The Common Cold—An Unaudited Expenditure

By N. W. HAIGHT

Chairman, Subcommittee on Health Promotion Activities, Office Management Committee, A. G. A.

ONE hundred million working days—between $500,000,000 and $2,000,000,000 in hard cash—is the estimated annual cost to industry as a result of the common colds.

Physicians who are concerned with the problem of morbidity among large groups of individuals, whether this be in schools, army camps, or in industry, realize that there is no health problem which compares in importance with the so-called "acute cold." Most of those persons contracting colds lose little time from their duties, but the number of persons affected each year is so large that the aggregate time lost from colds far surpasses that from any other disease.

In the past few months respiratory infections have been prominent in the news, with reports from all over the country that sore throats, fever, aching backs and eyes had sent many people to bed. Official comments have varied from "the usual increase of colds for this time of year" to "the worst epidemic of influenza in years." But whether mild or virulent, the cold continues to make its periodic sweep of the country and to demand its toll from companies through loss of time by employees. If you are skeptical as to whether your organization is bearing its share of the cost in this respect, analyze your own employees' illnesses of the past several months. The results of such an analysis will surprise you.

Loss to Industry

Figures 1 and 2 indicate more clearly than can words just what the common cold means to business and industry. These results of an accurate survey, based on the experiences of one company over a period of ten years, indicate that four out of every ten men and seven out of every ten women in the employ of that organization were annually disabled by colds.

In the face of these statistics it must be added that the danger of colds lies not so much in the colds themselves as in the complications that may follow. Although the more vicious pulmonary diseases, such as influenza, pneumonia and tuberculosis, are all different infections with different germs playing a part in each, it is the common cold that so often precedes them and prepares the way for their frequently fatal development. According to one prominent New York physician, about fifty per cent of all disabling diseases start in their early stages with a cold in the head and that even a higher percentage applies in the case of pneumonia.

It is known that colds can be transmitted from one person to another and they are therefore commonly referred to as contagious. It is also held that this

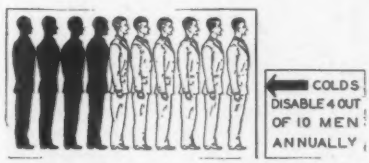


Figure 1

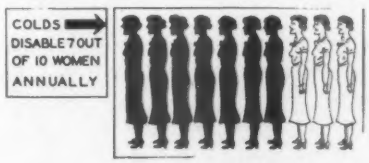


Figure 2

transmission of the infection is through personal contact or proximity of the infected person to the one uninfected, and it is generally conceded that germ-laden air is perhaps one of the principal means of transmission.

Many physicians agree that colds are more prevalent among persons in a run-down physical condition, resulting from over-exertion, loss of sleep, or lack of sufficient resistance to throw off the infection. Uneven chilling of the body, prolonged exposure to cold or unsettled weather, or other such experiences, may bring on a cold, leaving the conclusion that a person in the pink of condition may withstand ravages of cold infection without serious effect, while a person in a weakened condition may fall easy prey to it. One person may have a slight cold, but the cold that another individual catches from him may have dire consequences, and it is for this reason that even the mildest cold is of vital importance and should be given as much attention as are other ailments often erroneously regarded as more serious.

The cost of enduring the ravages and effects of colds in industry, both from the employee and employer viewpoint, is grossly out of proportion to necessity. Here is an annual cost estimated at better than a round billion dollars which has been, until recently, largely neglected. This should not be interpreted to mean that no industry or company is attempting to curb this condition, for it is well known that some of the larger industrial concerns have devoted much time to research and practical work in this regard with varying degrees of success. However, the gas industry generally has not given the subject the time or thought it merits.

Company Programs

Although most of the companies in the industry have seen fit to set up their own safety organizations in connection with campaigns to minimize accidents, such departments have not only been established for direct safety campaigns, but have been maintained year after year and without doubt have effectively served their purpose and will continue to do so. But how many gas companies are devoting much time or money to the elimination of colds? The answer is quite obvious but somewhat difficult to comprehend. Compare this to the huge police forces, both public and private, to which we indirectly contribute with a view toward combating the large number of criminals today who take their toll of an estimated fifteen billion dollars annually. This amount, which each year is exacted by the criminal element, is ten to fifteen times the cost of colds to industry, it is true, but is the expenditure to eliminate colds one-tenth, or even one-fifteenth of that spent annually to curb crime? Again the answer is obvious.

If the annual cost of colds in labor lost and in dollars and cents, great as it is, were the only worry in this connection, it might be accepted as the unavoidable burden which it is necessary to bear. There are, however, the more tragic aspects of colds to consider. They not only incapacitate their victims and keep them from employment, but frequently cause such victims to suffer serious complications when not treated promptly and efficiently and, in addition, also often kill or permanently injure those thus affected.

Omitting again consideration of employee welfare and the grave complica-

tions arising from colds, it can be readily seen from a study of the figures quoted in this article that colds in themselves are an important health problem. This is a problem which it is doubtful that you or anyone of us can afford to overlook, when it is realized that colds are causing a loss of 100,000,000 working days in business per annum, representing a dollars and cents loss of between $500,000,000 and $2,000,000,000—with a conservative estimate placed at a round billion dollars.

This article has not attempted to define colds or their causes but primarily to focus attention upon a subject unquestionably deserving consideration but, unfortunately, heretofore largely neglected. Later, another article on the same subject will be presented, but devoted to non-technical but proven practical methods and suggestions which are beneficial in reducing or minimizing colds and their consequent cost. It is also planned by the Committee to present at the fall convention a speaker qualified to intelligently discuss this subject and offer his thoughts as to possible means of curbing an ever increasing toll.

Credit Conference

PUBLIC utility credit executives are to meet at the Stevens Hotel, Chicago, for a series of conferences, June 21-24, during the Credit Congress of Industry, which is to be held as a part of the 42nd annual convention of the National Association of Credit Men.

R. W. Forwood, Consumers Power Company, Grand Rapids, is national chairman of the group. Discussion will be concentrated on credit subjects, particularly affecting public utilities.

Accounting Conferences

"The Luncheon Conferences offer an incentive to every utility executive to have as many of his accountants at the Convention in September as is possible. These Luncheon Conferences, because of their informality, result in an interchange of ideas created by a freedom of expression which I know from talking with those of my organization who have in past years attended these conferences, have benefited the company far in excess of the expense of sending these men to the Convention."

Herman Russell

President, Rochester Gas & Electric Corp., Rochester, N. Y.

Pictured above are those in attendance at the one-day Customer Relations Conference, held in the Palmer House, Chicago, April 22. The meeting was sponsored by the Accounting Section

To Simplify Accounting

BE it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That hereafter, in making payments for commodities or services the quantity of which is determined by metered readings, such as gas, electricity, water, steam, and the like, where the period covered by the charge begins in one fiscal year or allotment period and ends in another, the entire amount of the payment may be regarded as a charge against the appropriation or allotment current at the end of such period. Approved by the President, April 27, 1937.

Changes in Retail Prices of Gas

FOR the first time in history a Federal agency has published a comparative statistical survey of gas rates. The United States Bureau of Labor Statistics Bulletin No. 628 "Changes in Retail Prices of Gas 1923-36" has been printed and may be obtained from the Superintendent of Documents, Washington, D. C., at ten cents per copy.

In its study of gas rates, the Labor Bureau computed the prices of two selected services, cooking, and cooking plus automatic water heating, for 50 cities on identical standards of heat units expressed in therms. 10.6 therms was taken as being representative of the monthly consumption of a range, and 30.6 therms as representing the monthly consumption of a range and an automatic water heater. These figures were determined from records and estimates received from gas companies, and from laboratory studies of the heat requirements for cooking and for water heating.

The Bureau's figures indicate that the price of gas for cooking and water heating began a sharp drop in 1928, when the construction of extensive pipe lines permitted the transportation of natural gas into new territory. From 1923-25 to 1936 the unweighted average monthly bill for 30.6 therms in 50 cities dropped from $5.91 to $4.50, a decrease of 23.8%. During this same period the unweighted average cost of 10.6 therms (representing the use of a range) dropped from $2.15 to $1.90 or 11.6%.

In terms of the index figures used by the Labor Bureau, the weighted average prices for 1923-25 equalling 100, the price of 10.6 therms in March, 1923, was 100.6, and in June, 1936, 96.9, a decrease of 3.7. The weighted average prices of 30.6 therms dropped from 100.6 to 86.4, a decrease of 14.2.

Of the 50 cities, 40 were using manufactured gas in March, 1923, 7 were using straight natural gas and 3 were using a mixture. Thirteen years later, in June, 1936, 25 of these cities were still using the manufactured product, 18 were using straight natural and 7 were using mixed gas.

Plans for these studies were reviewed by qualified experts in the United States Bureau of Standards, the Bureau of Mines, the Federal Trade Commission, and the Central Statistical Board. In its Preface the Labor Bureau made special mention of the cooperation of Paul Ryan, chief statistician of the American Gas Association, stating that "Comments and suggestions made by these experts have materially increased the usefulness of the data."

GAS USE GAINS IN BRITAIN

According to figures released by the British Commercial Gas Association, the amount of gas consumed in the British Isles during 1936 reached the new high figure of more than 342,000 millions of cubic feet, an increase of 3 per cent over the total of the previous year. In the same period the number of customers advanced 247,741 to a total of 11,318,174.

Commercial Section

F. M. Banks, Chairman J. W. West, Jr., Secretary Hugh Cuthrell, Vice-Chairman

Sales Topics Stressed at Natural Gas Meeting

H. H. Cuthrell

TWO lively and well attended meetings devoted to sales and utilization topics were a feature of the Natural Gas Department convention in Kansas City, Mo. The first session was held Wednesday afternoon, May 12, with Hugh H. Cuthrell, vice-president, The Brooklyn Union Gas Company, presiding in the absence of C. E. Bennett, who was unable to attend the convention.

The opening paper at this session was presented by L. A. Bickel, Dallas Gas Company, Dallas, Texas, on "Developments in Commercial and Domestic Air Conditioning." Mr. Bickel's paper proved to be of outstanding interest to the natural gas men. It has been reproduced in full elsewhere in this issue.

"Air Conditioning" Relative

In an excellent discussion of Mr. Bickel's paper, Carl Dean, Oklahoma Natural Gas Company, Tulsa, Okla., brought out the fact that to the individual, the meaning of the term "air conditioning" depends on the normal atmospheric conditions of a particular locality. "In a large section of the country it means heating," he said, "in Oklahoma it means cooling, although if the dust bowl area continues to move eastward, air cleaning will rank with cooling in importance. Along the Gulf and Atlantic seaboard humidity control may be the first requirement."

Natural gas is the logical source of energy for year 'round air conditioning, where it is available, Mr. Dean stated. "Regardless of local conditions natural gas can be adapted to take advantage of them. If quantities of water at temperatures below 60 degrees F. are available at reasonable cost for summer operation, gas-fired dehumidifiers can be installed to convert the latent heat to sensible heat, which can then be removed by the water circulating through cooling coils placed in the air stream."

"In other territories," Mr. Dean continued, "where refrigeration is necessary, natural gas lends itself to a variety of types of equipment. If heating boilers of relatively high pressure are used for winter, steam ejector equipment to chill water may be the answer to the cooling problem. Low pressure steam lends itself to the absorption system. Gas engine operation of refrigerant compressors has proved itself a marvel of efficient, flexible, economical control of summer conditioning loads."

A compelling exposition of "The Benefits of Employee Selling to the Employee and the Company" was delivered by S. B. Severson, Republic Light, Heat & Power Co., Inc., Buffalo, N. Y. As a result of almost a decade of experience in employee sales participation as practiced successfully by a group of gas companies serving over 85,000 customers in western New York and the Province of Ontario, Canada, Mr. Severson concludes that employee selling has greatly benefitted both the employee and the company.

For the employee, "it has opened up new jobs for him, either in the regular sales force or in other phases of operation. It has offered him an opportunity to develop latent talents, provided a means to express those talents, given him a chance to record his achievements in the eyes of the management, increased his earnings and made his work more enjoyable."

F. M. Rosenkrans

In turn, "the company has benefitted through having trained men available instantly to undertake almost any kind of job which may arise. Appliance sales from employee selling have continued to increase, amounting to $195,000 for the past year as compared with $152,000 for the previous year. We have found that in the face of an increased sales force and better business conditions, the proportion of employee selling has remained around 30 per cent of the total sales."

Frank T. Rainey, The Ohio Fuel Gas Company, Columbus, Ohio, and J. G. Ames, Western United Gas and Electric Company, Aurora, Ill., in discussions of Mr. Severson's paper, supported his conclusions.

Advertising Results

Under the title, "Make Them Ashamed," Will C. Grant, Lone Star Gas System, Dallas, Texas, told how the national advertising campaign is making women ashamed of their kitchens unless they are equipped with modern gas ranges. "During the first year," Mr. Grant said, "the national advertising campaign has planted impressions, has changed the trend of national consciousness. This trend now is flowing toward the gas kitchen as the up-and-coming thing for up-and-coming people."

Mr. Grant stressed the fact that dealers in many parts of the country are awakening to the potential market in gas ranges and water heaters. "For a time many dealers thought the gas range business about dead" he said. "Now many of the same dealers are displaying late models in their windows and others, especially department stores, have opened separate appliance stores." Mr. Grant then outlined some of the steps taken by the companies in his territory to gain the

Regional Sales Conference

in Rye, N. Y., June 10-11

The 1937 New York-New Jersey Regional Gas Sales Conference, sponsored by the Commercial Section of the American Gas Association, will be held June 10 and 11 at the Westchester Country Club, Rye, N. Y.

Herman Russell, president, American Gas Association, and president, Rochester Gas and Electric Corp., will address the opening session on the subject of "Combination Company Sales Responsibilities." Other speakers at the conference include: E. P. Prezzano, Mt. Vernon, N. Y.; Elizabeth Sweeney, Geneva, N. Y.; Dr. Daniel Starch, New York, N. Y.; Frank Lyons, Dayton, Ohio; Paul Dorsey, Chicago, Ill.; N. T. Sellman, New York, N. Y.; and A. G. Blake, Pittsburgh.

A new feature being introduced at this conference is a panel discussion of sales plans conducted by Hugh Cuthrell, Brooklyn, N. Y., and six key sales managers. The discussion will be in the form of a cross-examination of those participating, with questions invited from the floor.

dealers' interest, using the national campaign as the springboard.

F. M. Rosenkrans, The Gas Service Company, Kansas City, Mo., presided at the second session, devoted to utilization and sales topics, which was held Thursday, May 13.

In the absence of W. M. Jacobs, Southern California Gas Company, Los Angeles, E. J. Strickland, of the same company, read Mr. Jacob's paper on "Gas Refrigeration Sales Methods." This paper appears elsewhere in this issue. C. B. Wilson, Arkansas Louisiana Gas Company, Little Rock, presented a discussion on the same subject.

Lyle C. Harvey, The Bryant Heater Company, Cleveland, Ohio, made a highly stimulating address on "New Developments and Designs in Domestic Appliances Which Are Now Available." Mr. Harvey emphasized the fact that gas equipment is being offered today which places the gas industry in a favorable competitive position. The big need, according to Mr. Harvey, is a specialty selling program which will place this equipment on the gas lines.

The final two papers of this session were devoted to water heating and house heating. A. L. McKinstry, Cedar Rapids Gas Company, Cedar Rapids, Iowa, explained the method of promoting water heaters which enabled his company to win a bronze plaque in the national water heating contest in addition to more than $600 in individual cash prizes. Of particular interest in Mr. McKinstry's paper was a description of the background of individuals making up his company's sales force.

Frank L. Adams, Public Service Company of Colorado, Denver, Colo., gave a detailed and informative picture of house heating sales methods in Denver. The experience of this company, Mr. Adams brought out, "has demonstrated that gas for heating can be sold in a large volume and at a satisfactory sales cost, in a locality practically surrounded by coal mines, and in a climate that has an average deficiency of nearly 6,000 degree days."

New Merchandising Setup Adopted in New York

CONSOLIDATED Edison Company of New York, Inc., announced, April 21, that effective July 1 it will discontinue the sale of domestic gas ranges. The display, demonstration, and taking of orders for approved merchandise will be continued under the Cooperative Merchandising Plan now in effect.

The Cooperative Merchandising Plan which was designed to increase the sale of appliances by dealers was started by the former New York Edison Company and the United Electric Light and Power Company in May, 1935, and continued by the Consolidated Edison Company. Up to that time, and since 1933 when the electric companies ended the practice of selling directly to customers, they had been engaged in a program of appliance sales promotion which included the turning over of leads to dealers to complete the sale.

Under the new cooperative plan, begun in 1935, the companies began taking orders for merchandise and transmitting the orders to approved local dealers through manufacturers without accepting any part of the purchase price of appliances sold, leaving all financial transactions, whether on cash or deferred payment sales, to be handled by the dealer who fills the order. This is the plan which is now in effect and under which domestic gas ranges will be merchandised. It is restricted to appliance dealers of high standing and limited to the sales of standard approved appliances.

In announcing the inclusion of domestic gas ranges in the Cooperative Merchandising Plan, E. F. Jeffe, vice-president in charge of sales, said: "It is our belief that material benefits will accrue to the industry as a whole in this territory as a result of the proposed change. The Consolidated Edison Company offers its full cooperation to manufacturers in the establishment of proper dealer outlets, in demonstrations, in the display, and in the sale of approved domestic gas ranges in accordance with our Cooperative Merchandising Plan."

Women's Clubs Like This House

National House, a low cost steel house in ultra-modern style, is fully gas equipped. The kitchen is shown on the right

WHEN a house meets with the approval of women's clubs, it sets a trend in home building. National House, pictured above, which faces the Hudson River on Riverside Drive, New York City, and is one of the first of over 500 low cost steel houses of this style to be erected in as many American cities this year, is architecturally ultra-modern.

Developed and supervised by William VanAlen, well known architect, from a plan suggested by the Federal Housing Administration, this small home was approved by the New York City Federation of Women's Clubs, because it is built for permanence, is spacious, economical to maintain and has many labor-saving appliances.

Through the cooperation of the Commercial Section and several appliance manufacturers full gas equipment is installed including house heating and water heating units, a refrigerator and a range, all automatic in performance, and economical to operate. The convenient, compact kitchen pictured is divided from the dining corner, by an attractive low partition, illustrating the elimination of waste space. Resistant to fire, wind, lightning, termites and earthquakes, this house is so well insulated it can be heated at reasonable cost in any climate.

Home Service Breakfast at the Natural Gas Convention

Home Service at Natural Gas Convention

EARLY risers to the number of eighty-five attended the Home Service breakfast meeting at the Natural Gas Convention in Kansas City, May 13. Association executives extended greetings and good wishes for continuance of the Home Service program as a regular feature of this convention. These executives were Herman Russell, president of the American Gas Association, Alexander Forward, managing director and George E. Welker, chairman of the Natural Gas Department.

A group of short talks on Home Service activities underway in natural gas companies was presented by home service directors. Mildred Clark, Oklahoma Natural Gas Company, stressed the sales significance of home service records and reports. She mentioned the particular importance of home service in dealer cooperation and mentioned the home call activity as the most important activity of home service work.

Mrs. Vera Ault of the Public Service Company of Colorado, described the dramatic appeal of the Gas Hospitality House recently set up by this company. Mrs. Ault stated that there has been a noticeable increase in public interest in gas as a news worthy topic of converation. There has been a significant increase in dealer advertising of gas appliances, Mrs. Ault brought out, and as a result of public demand 85% of the heating equipment sold by dealers to new homes is gas designed. Finally, Mrs. Ault reported, the gas appliance sales of the company have not only increased but have advanced at a proportionately faster rate than the electric appliance sales. It is felt that the Gas Hospitality House has made a substantial contribution to these improvements.

The mechanics of setting up group demonstrations in homes were discussed by Betty Boyle, of The Gas Service Company, Kansas City. The purpose of the demonstrations is to illustrate food preparation showing proper top stove cookery, use of the oven and broiler, and instruction in the proper use and care of the range. Mrs. Louise Hurster, Laclede Gas Light Company, St. Louis, Mo., described the special service given to new gas range users. In addition to home calls, special instruction classes are given at the gas company lecture room.

Of considerable interest was a talk by Leone Waddell of Servel, Inc., who described amusing experiences of home service directors in calls on new purchasers of gas refrigerators. In most cases this piece of automatic equipment was a new experience and, as a result, some very unusual uses are reported. One woman decorated her refrigerator shelves with colored oil cloth to match the color scheme of the kitchen and, of course, in doing so interfered with the circulation in the box; another woman bought a refrigerator for the express purpose of storing her daughter's fur coat for the summer; and strange as it may seem, one woman who complained that her refrigerator did not make ice cubes was discovered to have not even put water in the trays!

A sales manager's viewpoint on Home Service was presented by C. B. Wilson, Arkansas Louisiana Gas Company, Little Rock. He stated that the electric companies were exceeding gas companies of the same area in the number of customer-contact employees of which home service women are a part. His plea was for a larger number of Home Service workers in gas company departments in order to provide for more effective service to customers as a means of combating competition.

As an effective climax, little Barbara Jenkins, six-year-old cook, was presented as the Home Service Girl of Tomorrow, by Jessie McQueen, of the American Gas Association, who presided as chairman of the Home Service breakfast program.

Home Service Conference at Cleveland

Advance registration for the Home Service Conference and Training Course indicates a large attendance of home service women as well as students and teachers from Colleges of Home Economics. This Conference will be given at the A. G. A. Testing Laboratory in Cleveland, June 15-18.

Actual working operation of home service work will be discussed in detail—studied in the form of actual sales-slanted demonstrations and home call skits, together with practical instruction on all types of domestic gas equipment.

Kitchen Planning will receive a full morning's discussion. "There Is Nothing Like Gas" is the subject of a talk by Hall Henry of The Utility Management Corp. Mr. Henry will outline the story of competition.

A broad social program will provide an opportunity for everyone to get well acquainted, and discussion conferences have been planned. Programs will be sent on request to the American Gas Association, New York.

Don't forget the dates—June 15 to 17 in Cleveland. Hotel Carter in Cleveland is Conference headquarters.

SELL 8,192 REFRIGERATORS

In a special campaign for the sale of gas refrigerators carried on by Consolidated Edison Company of New York, Inc., and cooperating electric appliance and plumber dealers during April, there were sold 8,192 refrigerators, according to an announcement by E. F. Jeffe, vice-president in charge of sales.

Industrial Gas Section

Ralph L. Manier, Chairman Eugene D. Milener, Secretary Hale A. Clark, Vice-Chairman

Industrial Gas Men Hold Lively Meeting at Natural Gas Convention

Hale A. Clark

Henry O. Loebell

C. L. Brockschmidt

L. W. Hungate, Jr.

E. J. Hatzenbuehler

AT the Industrial Gas Sales Conference held May 13 in Kansas City, Mo., in connection with the convention of the Natural Gas Department, four important general subjects were featured. A paper was presented on each subject by an outstanding industrial gas sales manager, followed by discussions. The subjects were: "Specialized Selling of Natural Gas," presented by Henry O. Loebell, Natural Gas Pipeline Company of America, Chicago, Ill.; "Natural Gas in the Heavy Heating Industries" presented by C. L. Brockschmidt, Mississippi River Fuel Corporation, St. Louis, Mo.; "Gas Engine Selection and Applications" presented by E. J. Hatzenbuehler, Lone Star Gas Company, Dallas, Texas; and "Increasing Efficiencies of Gas Power Boilers," presented by L. H. Hungate, Jr., Memphis Power & Light Company, Memphis, Tenn.

The Industrial Gas Sales Conference was arranged by the Program Committee of the Industrial Gas Section, Frank H. Trembly, Jr., chairman, and W. Jennings Young, vice-chairman. Hale A. Clark, vice-chairman of the Industrial Gas Section, presided.

Specialized Selling

In presenting the subject "Specialized Selling of Natural Gas" Mr. Loebell pointed out how certain loads can be secured and held the year 'round at very favorable rates, if natural gas companies adopt the policy of furnishing the complete coverage and engineering service which most manufactured gas companies have used as a means of securing high rate year 'round business. He expressed the opinion that the customer survey would be found to be the foundation stone on which campaigns for this business could be built.

D. W. Chapman in discussing this subject pointed out that in Chicago during 1936 marginal business represented over 14½% of the total sendout and accounted for over seven million dollars revenue, or slightly over 10% of the gross total. During that same period, he said, the "interruptible sales," which include the types of business more generally sold by natural gas companies, reached a volume of 40% of the total output, but returned a revenue of only 9½% of the total gross. Mr. Chapman strongly endorsed the continuous customer survey for securing this high rate marginal business.

This subject was further discussed by E. W. Esslinger, The Cincinnati Gas & Electric Company, Cincinnati, Ohio; Worden Pope, Public Service Company, Denver, Colo.; and D. A. Campbell, Eclipse Fuel Engineering Company, Rockford, Ill. Mr. Esslinger said "I would like to close my discussion by saying that this type of business is one of the best loads. It is stable, it is diversified, it is sold at the higher rate schedules, and it is an asset that we should all attempt to put on our books."

Mr. Pope pointed out that his company in Denver found by experience that marginal industrial business justifies having an industrial representative for approximately each 800 customers and that by aggressive solicitation they have been able to obtain a large volume of this load at higher rates than otherwise would have prevailed.

Gas in Heavy Heating Industries

Mr. Brockschmidt presented the subject "Natural Gas in the Heavy Heating Industries" in a most interesting and complete manner, using open hearth furnaces as an example. He said in part: "While I am confining my presentation to open hearth furnaces, which may not be of direct interest to some of you, what is said in a general way about open hearth furnaces is applicable to nearly every other large volume, high temperature application of natural gas." He not only gave examples of how this business had been secured by his company but presented some interesting figures of operations in comparison with oil and some technical data on the application of natural gas to open hearth furnaces.

His paper was discussed by T. E. Wood, The Manufacturers Light & Heat Co., Pittsburgh, Pa.; J. H. Gumz, Pacific Gas &

Industrial Sales Conference

June 8-9 in Chicago

The National Conference on Industrial Gas Sales will be held at the Palmer House, Chicago, Illinois, June 8 and 9, under the joint auspices of the American Gas Association, Industrial Gas Section, and the Midwest Industrial Gas Sales Council. A feature of the Conference will be an all-day inspection trip on Wednesday, June 9, at which time those attending will have an opportunity to see a number of modern industrial gas applications in representative Chicago factories.

On June 7, the day prior to the Conference, the Managing Committee of the Industrial Gas Section will hold its final meeting of the current Association year. Among the other committee meetings of the Section which will be held on June 7 are: Ferrous Metals Committee, Robert G. Guthrie, Chairman, and Process and Comfort Air Conditioning Committee, L. A. Bickel, Chairman.

Electric Co., San Francisco, Calif.; and W. O. Owen, Surface Combustion Corp., Chicago, Ill. Mr. Wood presented facts and figures on the operation of open hearth furnaces in Pittsburgh and West Virginia areas and gave a number of pointers on how this business should be handled in competition with oil. Mr. Wood also outlined the unusual progress which natural gas in his territory has made in the ceramic industry.

Mr. Gumz, in discussing the subject of natural gas in the heavy heating industries, dramatically described the march of natural gas to the industries in northern California where the pipe lines have become loaded almost to their capacities chiefly with interruptible business. He concluded that "this therefore means that we are now entering into a second stage of selling natural gas to industry, namely, that of changing over many of our customers from shut-off service at low rates to rates which represent material premiums for gas as compared to fuel oil and under which continuous service will be guaranteed. We feel that during the past several years, many of our industrial customers have, through the use of gas, been able to place a definite value on its advantages so that it will be possible to obtain for the service a rate which more nearly represents its intrinsic value."

Mr. Owen pointed out the great progress that has been made in applying natural gas to many heavy heating operations such as continuous pack and pair furnaces; annealing, chiefly through the use of gas radiant tubes; slag heating furnaces; soaking pits and miscellaneous auxiliary furnaces.

Based on one of the widest experiences in the industry, E. J. Hatzenbuehler, who is chairman of the Gas Engine Committee of the Industrial Gas Section, in well chosen words placed before the meeting the subject of "Gas Engine Selection and Applications." He pointed out the great interest that has developed recently in the automotive type of engine when adapted to natural gas. He said that that has caused quite a revision in the thoughts of industrial gas men, many of whom had previously worked only with heavy duty engines of the larger size.

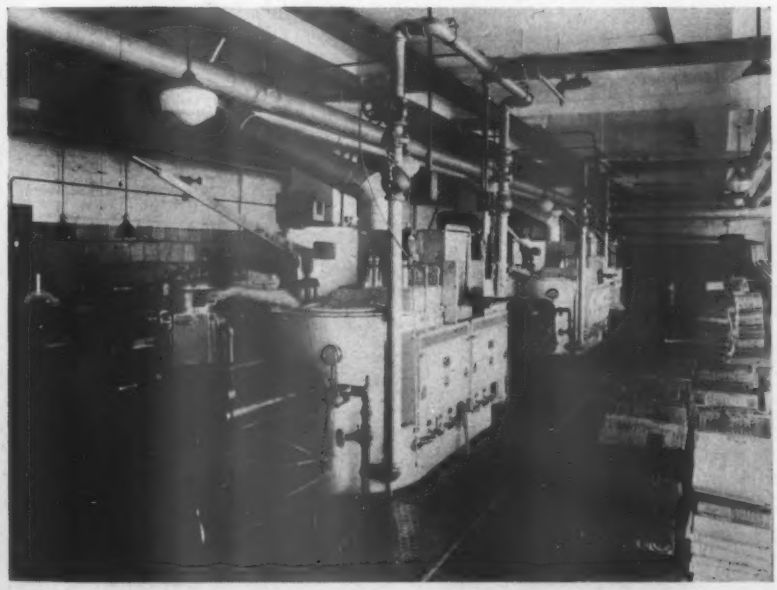
After Mr. Hatzenbuehler had presented the subject, it was discussed by Dwight W. Edwards, Oklahoma Natural Gas Co., Tulsa, Okla.; W. G. Durant, Lycoming Manufacturing Co., Williamsport, Pa.; W. J. MacIntyre, Arkansas-Louisiana Gas Co., Shreveport, La.; and Edwin Snook, Amarillo Gas Co., Amarillo, Texas. Mr. Edwards said that natural gas companies must take cognizance of gas engines for electric power generation because the "package power" plants are available and are now being aggressively promoted by their manufacturers. He said that in so far as his company is concerned the gas engine load is an actuality and that they are now serving over 20,000 H.P. in diversified lines at an annual revenue of more than $100,000.

Mr. Durant gave a technical discussion of gas engine electric power generation. He prefaced his remarks as follows: "It must be granted that purchased power, which these plants replace solely because of their economy, requires no attention on the part of the consumer. Consequently, to replace this form of power, every possible means of automatic plant operation requiring a minimum attention is essential. In most cases, persons available to operate the smaller types of plants are relatively unfamiliar with internal combustion engines or electric generators."

"The plant should be capable of operating twenty-four hours a day for at least thirty days with practically no attention. At thirty-day periods, the plant should be thoroughly checked by a skilled mechanic of the gas company or the engine manufacturer. This inspection might well be termed 'preventative maintenance,' as actual overhauling maintenance requirements are very small."

Mr. Snook analyzed the irrigation load both from the viewpoint of the farmer and the gas company and concluded that where the business is placed on the line, after all factors, economic and otherwise, are taken into consideration, the gas engine irrigation load is a valuable one to the gas company and a useful adjunct to the business of the farmer.

INDUSTRIAL GAS AT WORK



NEWSPAPER SAVES MONEY WITH GAS—HERE ARE THE TWO BIG NEW STEREOTYPE FURNACES BEING USED BY THE "DAILY NEWS" IN ITS UP-TO-THE-MINUTE BROOKLYN PLANT. EACH IS CAPABLE OF MELTING 12 TONS OF METAL AT ONE TIME. SPEEDY, LOW-COST OPERATION IS OBTAINED BY USING GAS-FIRED IMMERSION BURNERS

Gas Boiler Efficiency

L. H. Hungate, Jr., introduced the subject "Increasing Efficiencies of Gas Power Boilers." Reasons given by Mr. Hungate why gas companies pay close attention to getting their boiler business on the soundest possible basis are: From the customer's standpoint, the attainment of high efficiencies are not followed by higher maintenance cost on either boilers or furnace materials and it is possible to increase efficiencies far beyond the range of crude fuels and not be plagued with so-called attendant evils. From the gas company standpoint, the boiler load is the quantity load desired by a pipe line project to get money in the cash register as soon as possible, after completion of the line. He said that the boiler load paid the bond interest while residential markets are being developed.

Following Mr. Hungate's presentation on the subject, L. S. Reagan, The Webster Engineering Company, Tulsa, Okla., Mr. Offut, A. P. Green Fire Brick Company, and W. W. German, Montana Power Co., Butte, Montana, elaborated on a number of points which should be borne in mind by gas boiler engineers in order that the service rendered to customers will be of the highest quality possible. Mr. Reagan pleaded for better furnace boiler installations.

Mr. Offut described the properties of the new insulating fire bricks and pointed out

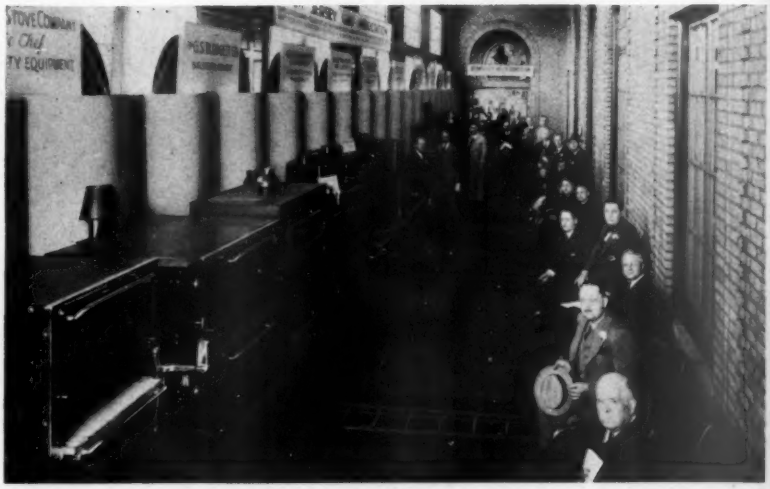
how they can be used to the best advantage in boiler settings. He said that the introduction of insulated fire brick is one of the greatest steps forward ever taken in increasing efficiencies and operating characteristics of gas power boilers.

Mr. German, who is chairman of the Steam Generation Committee of the Industrial Gas Section, in further discussing this subject pointed out that methods of increasing the efficiency of gas power boilers received their greatest impetus during the depression when thousands of industrial plants were forced to reduce their over-all fuel bills. He cited several examples showing how different situations arising in connection with boiler business were met during the depression, and said that in retrospect the comparatively few number of customers who switched from gas to a competing fuel during that period is a tribute to the basic advantages of gas fuel and the ingenuity and hard work of the industrial departments of the industry.

Treatise on Furnace Atmospheres

AN interesting treatise on "Furnace Atmospheres" which was read by A. J. Fisher, fuel engineer, Bethlehem Steel Company, Sparrows Point, Md., before the Association of Iron and Steel Engineers, has been reproduced for distribution by The C. M. Kemp Manufacturing Company of Baltimore, Md. It contains nineteen pages of graphical information and is available upon request to the Kemp company.

Gas Cooking Equipment Shown at Hotel Exposition



Gas exhibit at the New Jersey hotel show. In the foreground are J. P. Leinroth, president, New Jersey Gas Association, and other well-known gas men who attended the exhibit

THE New Jersey Gas Association, with the aid of local gas utilities and manufacturers of commercial cooking equipment, sponsored a successful exhibit in the nineteenth annual Spring hotel exposition of the New Jersey State Hotel Association, at the Hotel Ambassador, Atlantic City, May 4-7.

A space, 90 feet long by 15 feet in width, was occupied by the gas exhibit. Modern ranges of various types and styles, bake ovens, deep fat fryers, ceramic type broilers, both counter type and heavy duty type, and other counter appliances, were on display.

It is estimated that approximately 5,000 people visited the exhibits. Many valuable prospects were interviewed and the amount of sales directly attributable to the display was quite satisfactory.

The gas exhibit was under the direct supervision of the Commercial Committee of the New Jersey Gas Association, H. A. Sutton, Chairman.

Gas Exhibit at New England Hotel Exposition

Shown here is the gas exhibit at the thirteenth annual New England Hotel Exposition which attracted a registration of 25,000 persons. This cooperative exhibit which was judged the finest in the show was sponsored by the industrial division of the New England Gas Association under the supervision of a committee headed by Philip A. Nelles, Jr., New England Power Service Company. Cooperating in the exhibit were the American Gas Association, Industrial Gas Section; New England gas companies; and a number of manufacturers of gas equipment

New Gas Fired Furnace

A NEW low-priced gas fired furnace with steel heating element has just been announced by The Fox Furnace Company of Elyria.

The steel heating element, of unique design, is constructed of an especially fine grade of 16 gauge steel having unusually high corrosion and rust resisting properties. Long fire travel is provided by channels which convey the products of combustion over a large area of heating surface. Fox engineers claim an exceptionally high efficiency for this unit.

Casings are rectangular and are finished in green crystalline baked enamel with dark green trim. Capacities of the Series "O" range from 51,000 B.t.u. per hour at register on the 0-2 to 127,500 on the 0-5.

Technical Section

M. I. Mix, Chairman H. W. Hartman, Secretary J. V. Postles, Vice-Chairman

Production and Chemical Men Hold Successful Three-Day Conference

Speakers addressing the Production and Chemical Conference. Left to right: B. J. Mullaney, Chicago; R. E. Kruger, Rochester, chairman, Gas Production Committee; F. J. Pfluke, Rochester; R. H. Arndt, Baltimore; Dr. Wilbert J. Huff, Baltimore; R. D. Williams, Troy; A. R. Bayer, Brooklyn

CHARACTERIZED by vigorous discussions and outstanding papers on many technical subjects, the three-day conference sponsored by the Production and Chemical Committees which took place May 24-26 in the Hotel New Yorker, New York City, was hailed as highly successful. More than 350 engineers and chemists gathered from many sections of the country to hear the papers delivered and participate in the discussions.

Repeating their success of last year, the luncheon conferences, held Tuesday afternoon, were one of the most popular attractions. Not only were they well attended but free and informal discussions brought valuable information on a host of subjects. Three luncheon conferences were held simultaneously and were divided into the following general groups: Coal Carbonization and By-Products, led by A. B. Huyck, The Brooklyn Union Gas Co.; Water Gas Operation, conducted by K. B. Nagler, and Gas Conditioning and Purification, with E. J. Murphy, The Brooklyn Union Gas Co., as discussion leader.

R. E. Kruger, of Rochester, N. Y., chairman of the Gas Production Committee, opened the conference with a brief discussion of his committee's activities. Outlining the organization of his committee, Mr. Kruger paid tribute to the work of the subcommittee chairmen.

Greetings of the American Gas Association were extended by Major Alexander Forward, managing director, who stressed the importance of the engineers and chemists in the future work of the gas industry.

B. J. Mullaney, vice-president, The Peoples Gas Light and Coke Company, Chicago, injected a new note into the otherwise technical proceedings of the conference by discussing sales and their relation to the technical men. He emphasized the fact that the biggest problem now confronting the industry is sales and urged the technical men to use their influence in selling the merits of gas. He told of the national advertising campaign and the gratifying results obtained in the first year of its operation. He indicated that the campaign had changed the trend of public opinion by selling the idea of the modernity of gas service.

The last paper presented at the first session was by W. M. Couzens and E. O. Mattocks, of the A. G. A. Laboratories, Cleveland, on "Effect of Reducing Atmospheres on the Combustion of Industrial Gas." This paper pointed out the need for controlling the atmosphere of furnaces and described

General view of the first session of the conference

In the picture on the left are, left to right: E. C. Uhlig, Brooklyn; Prof. J. J. Morgan, New York; J. F. Anthes, Brooklyn, chairman, Chemical Committee; L. N. Van der Pyle, Pittsburgh. At the right are: D. S. Reynolds, Boston; Victor Starzenski, Troy; J. E. Cooper, Utica

the development of new apparatus for accurately determining atmospheric conditions. It was sponsored by the Committee on Industrial Gas Research and marked the first time such a subject had appeared on the program of a Production and Chemical Conference.

J. F. Anthes, of Brooklyn, N. Y., chairman of the Chemical Committee, opened the Monday afternoon session with a brief report of the activities of that committee.

Coke Breeze Studied

Summarizing the results of a study begun in 1935, F. J. Pfluke, Rochester Gas and Electric Corp., presented a paper on "Crushed Coke Size as Affected by Coke Breeze Admixture to Coal Prior to Carbonization." All of the tests reported were conducted at Rochester where 100% high-volatile washed Pittsburgh crushed coal was used and at Philadelphia where a blended coal mix consisting of 80% high-volatile Powellton coal and 20% low-volatile Pocahontas coal was used.

Each plant conducted separate tests using screened breeze designated by sizes ranging from minus $^1/_{32}$" up to minus $^1/_4$". It was brought out in Mr. Pfluke's report that the limit of the amount of breeze is 4% of minus $^1/_{32}$", 3% of minus $^1/_{16}$" and 2% of minus $^1/_8$". "Providing these limits are observed," he reported, "the percentage of salable or usable coke from the initial charge remains almost unchanged when breeze is added compared to the percentage of salable or usable coke from the initial charge with no breeze added."

The role of the chemical engineer in house heating was described in a stimulating address by C. F. Turner, chief chemist, The East Ohio Gas Company, Cleveland. Mr. Turner stated that few companies have chemical engineers in their house heating sales and promotional work. This condition, he said, was particularly true of natural gas companies who, generally speaking, do not maintain chemical laboratories. However, as a consequence of a change in type of gas distributed some chemically trained men have been introduced to house heating work.

Mr. Turner recommended the use of the chemical engineer in three classifications of house heating work, i.e., employee job training, better utilization, and continued research. The chemical engineer, he pointed out, is splendidly trained to instruct employees in the fundamentals of combustion, and to answer questions relating to gas composition, the behavior of metals, the use of gas analyses and allied matters. In the practical engineering side of house heating there is also a fertile field for the chemical engineer. However, Mr. Turner brings out, it is in the field of research where the chemically trained man is most obviously needed. Some of the uses of the chemist in this field mentioned by Mr. Turner are: to cut down on service compiaints, improve conversion burners, lengthen the life of equipment, flue pipe and chimney lines, study heat application, and improve burner performance.

Holder Discoloration

The Tuesday morning session opened with a paper by Dr. J. R. Skeen, The United Gas Improvement Co., Philadelphia, on the "Treatment of Holder Waters To Eliminate Paint Discoloration." This paper brought out that expensive paint jobs on holders had been rendered useless from a beautification standpoint in a few weeks or months by the formation of rusty brown sediment on the plates. In a study of this problem, it was discovered that the cause of this discoloration was a small microscopic plant which absorbs dissolved iron and turns a rusty brown color. Further study established that this holder discoloration could be eliminated at low cost by the use of sodium bicarbonate and sodium dichromate dissolved in the tank water in carefully chosen concentrations.

Following Dr. Skeen on the program, Ralph D. Williams, Hudson Valley Fuel

Typical discussion during a recess at the conference. Included here are: A. R. Bayer, Brooklyn; W. G. Krake, N. Y.; W. M. Africa, Manchester; J. R. Wobrley, New York; R. L. Presbey, Boston, and others. Pictured at the right is E. J. Murphy, Brooklyn, at the Gas Conditioning and Purification Luncheon Conference

At their ease in between sessions. In these two photographs are, left to right: Erick Larson, New York; Charles F. Turner, Cleveland; G. E. Ludwig, Grand Rapids; F. B. Parke, Brooklyn; S. A. Mills, Kearny; A. H. Schaaf, Brooklyn

Corporation, Troy, N. Y., discussed "Dust Elimination in Coke Plants." In handling coal at the company's Troy plant, he stated, coals were sprayed with a small amount of water to prevent dustiness. Mr. Williams described a vacuum cleaning system used at the plant which cost $5,500 and averaged about $100 per year for replacements and repairs. He also described a coke dust control system which removes dust at points of formation in the coke handling plant. It was found that an exhaust system of adequate capacity to collect dust from over thirty points of formation was necessary. The dust collecting equipment is made up of hoods, ducts and a dust separator connected to an induced draft fan which discharges into a 200-ft. stack. It was pointed out that the cost of maintenance has been negligible in a year and a half of operation.

This session concluded with a paper on "Some Aspects of the Flexibility of Plant Control of the Heavy Oil Process" by W. E. Lebo, Public Service Electric & Gas Co., Harrison, N. J. In a description of operations at the Harrison plant, Mr. Lebo pointed out that the percentage of hydrogen and hence gravity may be varied by different methods of operation. The results of tests at the plant, he stated, indicated "that the flexibility for any one set of conditions is subject to the carbon content of the oil. However, proper adjustment of the many known variables controlling the process should permit its use for the production of other gases differing in analyses and heating values."

The session, Wednesday morning, opened with a paper entitled "Effect of Cyanogen—Organic Sulphur upon the Stoppage Problem," by E. J. Murphy and A. R. Bayer, The Brooklyn Union Gas Company, Brooklyn, N. Y. The joint authors described how they analyzed deposits accidentally produced during experimental work and then reproduced them synthetically to prove their analysis. They further pointed out that similar deposits occurred in needle valves under actual service conditions. In their studies they found that the minute quantities of cyanogen and organic sulphur in the gas corroded copper and iron and produced a complex substance which, when decomposed by heat, produced nitric oxide similarly to the identification test for vapor phase gum. Thus another member has been added to the family of stoppage causes, the better known ones being moisture, dust, naphthalene, liquid phase and vapor phase gum.

Gas Production Economies

Leon J. Willien, Public Utility and Engineering & Service Corp., Chicago, and E. A. Dieterle, consulting engineer, Chicago, presented a paper entitled "A New Idea in Gas Manufacture." Messrs. Willien and Dieterle stated that since the chemical efficiency of gas manufacture has progressed to such a degree that only small improvements are left to be effected, it will be necessary to make a radical departure in order to make any sizeable economies. They suggest that the production and sale of the maximum amount of by-products will result in a large-scale reduction in the cost of gas production.

It was also brought out by Messrs. Willien and Dieterle that figures gathered from various sources indicate that gas oil or fuel oil may be cracked in a modern pipe still by the use of heat produced in the manufacture of blue gas. Thus refinery gas would be produced to enrich the blue gas and gasoline and either residuum oil or oil coke would be the by-products depending upon the degree of the cracking practiced. The practical application of this idea, therefore, is largely dependent on the local market for the large quantities of by-products which would be produced.

The last paper of this session was given by A. T. Ireland, The Philadelphia Gas Works Company, on "Internal Inspection of Water-Sealed Holders." Mr. Ireland is convinced "that all holders should be internally inspected at least every 25 years, if for no other reason than to inspect the permanent frame." He described methods of handling the large volumes of gas saturated with water which must be disposed of before the inspection is made. Mr. Ireland also prescribed the precautions which must be taken for the safety of the workmen as well as the many special points which require checking in order to do a thorough job.

Herbert W. Alrich, Consolidated Edison Co. of New York, in commenting upon Mr. Ireland's paper, stated that he had torn down more holders than he had built in a corresponding period of time and that in many he found evidences of internal repairs. He also recommended the twenty-five year internal inspection period.

The afternoon session began with a brief summary of a large amount of data on "The

More speakers, formal and informal. Left to right: E. O. Mattocks, New York; J. E. Maconachie, Toronto; W. M. Conzens, Cleveland; H. W. Alrich, New York; W. T. Jebb, Hartford; J. D. Davis, Pittsburgh; W. E. Lebo, Harrison; A. T. Ireland, Philadelphia

Economics and Operation of Automatic Grates" which had been gathered by R. H. Arndt, Consolidated Gas Electric Light and Power Co., Baltimore, Md., from seventeen companies. The outstanding fact, as pointed out by Mr. Arndt, is that the operators are all satisfied that the automatic grates are saving them money whether they were installed by one company or another.

In many cases, Mr. Arndt said, the circumstances under which the apparatus was brought have greatly changed and still the automatic grates are satisfactory, showing a remarkable degree of flexibility in operation. Through the cooperation of the manufacturers and operators, many of the difficulties in maintenance which occurred in the earlier years have been completely eliminated so that they now have an excellent record for dependability, he said.

Following Mr. Arndt's presentation, a paper by Joseph D. Davis and Clarence R. Holmes on "Blending of Certain High-Volatile Coals with Beckley Bed Coal and the Effect on the Yield and Quality of Carbonization Products" was presented. This was a contribution from the Pittsburgh Experiment Station, U. S. Bureau of Mines, and is a continuation of the fine work which they have done in the past. Tests were made on the 18" B.M.-A.G.A. retort at 900° C. in which 20 and 30% of Beckley low-volatile coal was blended with seven high-volatile A coals and with one high-volatile C coal. The yields and quality of products were determined and compared with those from 100% charges of the constituent coals. The data and conclusions drawn were all given in the report.

The final paper was a compilation of "New Wrinkles" by H. J. Meredith, Koppers Co., which gives some fifty ideas, with their authors, for overcoming certain difficulties or simplifying certain procedures which may be of help to other members of the gas industry.

GAS HYDRATES IN NATURAL-GAS PIPE LINES

(Continued from page 222)

of the plug at 125 pounds per square inch gage would be expected.

In February 1937, a freeze-up of the 20-inch main line occurred at a point close to the Bureau's thermometer station in the Black Forest. The line was almost completely plugged with hydrates. Attempts were made to heat the line and to lubricate alcohol into the line to relieve the plug without a great deal of success, because the exact location of the freeze-up could not be determined and the flow of gas through the line was reduced greatly by the plug. Depressuring of that section of the line then was resorted to, with the result that when the gas was turned into the line again the hydrate had decomposed enough to allow resumption of normal gas flow. Following the resumption of service, the drips along the line were blown and an estimated total of 1,300 gallons of water was removed. The gas pressure at this point normally is from 200 to 250 pounds per square inch. The temperature of the gas in this region as registered by the recording thermometer which the Bureau has installed there was 38° F. Referring to the hydrate curve for this gas, it is observed that at this temperature hydrates will not decompose until the pressure is reduced to 160 pounds per square inch.

Although the Bureau's study is far from complete and many questions are yet to be investigated, the information collected seems to justify a few suggestions regarding operating methods to avoid freeze-ups due to hydrate formation. These are enumerated below:

1. Where feasible and economically practicable, remove water from the gas to a point where it will not condense in the pipe line.

2. Where it is impracticable to dry the gas, install means of checking the gas temperatures at intervals along the line.

3. Keep a check on the gas pressures in the line at corresponding points.

4. Determine or estimate the hydrate formation characteristics of the gas being transported, and in so far as possible keep the pressure of the line under that at which the hydrates will form. If it is necessary to operate in the region of temperature and pressures where hydrates form, operate the line at conditions favorable to decomposition at least part of the time and remove the water released upon hydrate decomposition from the line.

5. Recording pressure gages and recording thermometers placed at intervals along the line furnish desirable operating information. If the pressure record indicates abnormal pressure fluctuations the presence of water or hydrate in the line may be suspected and remedial measures used to avoid a serious stoppage of the line.

Future Program of the Bureau

Many questions concerning gas hydrates remain to be answered. The Bureau expects to continue this investigation, with the aid of the Natural Gas Department of the American Gas Association, in an endeavor to clear up these questions. The helpful cooperation of the industry in the work that has been done is highly appreciated, and continued cooperation in furnishing information that will assist in obtaining practical solutions of the various problems is solicited.

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An army, of course, marches on its stomach, and mindful of this, the War Office has installed gas cookers.

—*Sunday Times*, London.

Gas Lamps and Sentiment

(From *The New Yorker*, February 20, 1937)

NEW YORK really is as quaint a city as you ever heard of: even has a couple of gas street lamps. These are down in the Village, in Macdougal Alley. We looked into it and found that they have survived through the sentiment of an elderly and determined lady named Mrs. Rothermel, a former actress, who used to live there. It's her theatrical instinct, she says, that makes her cherish the gas lamps.

When she lived in the Alley, her Negro servant lighted the lamps at dusk, using a candle on the end of a long pole. Lamps survived the electrification of the city lighting system, in 1915, because Macdougal Alley is privately owned, but about four years ago the Alley residents decided that they were fed up with gas lighting and wanted electricity. They told the gas company that they weren't going to pay any more bills, and the gas company prepared to rip out the gas main that supplies the lamps. Mrs. Rothermel tried to point out to the Alley folk the sentiment behind the lamps—"You go to London to see Dickens' home, or Thackeray's, or even the Bard's," she told them. "The lamps are just as important to Macdougal Alley"—but they remained cold.

In this crisis, Mrs. Rothermel enlisted the services of her son, a rubber-company executive, and the two of them approached Colonel O. H. Fogg, vice-president of the Consolidated Gas Company. Mrs. Rothermel explained the sentimental and historical value of the lamps, and Colonel Fogg was impressed. Finally the company agreed to furnish gas for nothing, and also to maintain the lamps—paint them once a year and keep them in working order. The people who live in the Alley may still want electricity, for all we know, but they haven't got much chance of getting it while Mrs. R. is around, for though she's moved to 18 East Eighth Street to live with her son, she's just as vigilant as ever.

Testing Laboratories

R. M. Conner, Director Managing Committee: J. S. DeHart, Jr., Chairman N. T. Sellman, Secretary

Attachable Water Heating Unit Standards Approved

THE first edition of listing standards for attachable gas water heating units without water-carrying parts, sponsored by the American Gas Association, were accepted as American Standard by the American Standards Association on April 22, 1937.

The adoption of standards covering these new types of gas-using units is another milestone in the rapid progress of standardization within the gas appliance industry.

Attachable gas water heating units covered by these standards consist primarily of the necessary materials such as insulation, jacket, small gas burner and suitable controls, for conversion of an ordinary range boiler into a complete automatic storage gas water heater. The rated input to these units is relatively small, making their application equivalent to slow recovery types of automatic storage heaters. The thermostats used are either of the conventional type extending through the tank wall into the stored water, or of a type where the thermal element is placed in close contact with the outside of the tank shell.

Standards Identical

For the most part, the new American Standard Listing Requirements for Attachable Gas Water Heating Units without Water-Carrying Parts are identical with approval standards for complete storage gas water heaters. It is specified that the attachable unit shall be installed according to the manufacturer's instructions upon one of three commonly used sizes of extra heavy range boilers, and then the whole assembly is tested as a storage water heater. The tank diameter and shell sheet height for which the unit is designed must be indicated on its name plate. Distinctive model numbers are required for units, even where they are similar in every respect except for character or thickness of insulating material used.

In conformity with the gas water heater approval standards, utmost safety and 70 per cent thermal efficiency are mandatory. The provisions for safe operation of these units are thorough, even to the extent of requiring that combustion of the gas be complete on small units with the draft hood removed and with a flat plate placed over the flue outlet. This provision is intended to safeguard the use of those units that are often installed in kitchens or living quarters without being connected to a chimney.

Printed copies of the previously mentioned standards may be secured upon application to the American Gas Association, 420 Lexington Avenue, New York City, American Gas Association Testing Laboratories, 1032 East 62nd Street, Cleveland, Ohio, or to the American Standards Association, 29 West 39th Street, New York City. The Laboratories are now in a position to test and list attachable water heating units under these standards.

Gas Hair Dryers Standards Endorsed

ON March 12, the first edition of Approval Requirements for Gas Hair Dryers was approved as American Standard by the American Standards Association.

The new standards cover thoroughly all phases of construction and performance of gas hair dryers and are completely correlated with the various gas appliance accessory requirements. In conformity with most of the other approval standards, the performance requirements cover appliances not only for use with manufactured and natural gases but also for propane and butane-air gases. The high spots in these standards are the requirement of gas pressure regulators on all dryers and the mandatory use of automatic controls on dryers equipped with more than a single helmet for each separate combustion chamber. Single helmet hair dryers not equipped with thermostats must provide a thermometer for indicating the drying air temperatures.

The American Gas Association Testing Laboratories are in position to test gas hair dryer equipment for approval under these new standards. Although a few appliances of this type were previously tested and approved under space heater, unit heater and central heating requirements, and are permitted under certain conditions to continue this approval and listing for a period of five years from the date of original approval, the sponsoring committee strongly recommended that such appliances be resubmitted for compliances with the gas hair dryer requirements.

As a matter of fact, in order to be approved as hair dryers and listed as such in the Association's Directory of Approved Gas Appliances and Listed Accessories, such appliances must be resubmitted to the Laboratories and tested under the new hair dryer standards.

Printed copies of the previously mentioned standards may be secured upon application to the American Gas Association, 420 Lexington Avenue, New York City, the Association's Testing Laboratories, 1032 East 62nd St., Cleveland, Ohio, or the American Standards Association, 9 West 39th St., New York, N. Y.

Accident Injury Rates in the Gas Industry

A GROUP of 457 gas utilities reporting to the A. G. A. Statistical Department and representing more than 85% of the manufactured and natural gas industry in the United States had a frequency rate of 15.4 disabling injuries in 1936 for each million man hours of exposure. This represented an increase of 11.6% over the frequency rate of 13.8 reported by gas companies for the year 1935. This was the highest frequency rate reported by gas companies since 1931 when the figure was 16.1.

These same gas utilities also reported a severity rate of 1.23 days lost in 1936 for each thousand man hours worked, a decrease of 5.4% from the severity rate of 1.30 reported for 1935.

An eight-year summary of accident experience of the manufactured and natural gas industry in the United States is presented in the report. For the manufactured gas companies the frequency rate rose to 14.1 in 1936, an increase of 17.5%. Natural gas companies also showed an increase in the frequency rate, which reached 17.3 for this group in 1936, or 4.2% above the figure reported for 1935.

The severity rate for manufactured gas companies fell from 1.00 in 1935 to 0.92 in 1936, a decrease of 9.2%. For natural gas companies the severity rate decreased from 1.77 in 1935 to 1.68 in 1936, a decline of 5.1%.

A summary of the accident experience of manufactured gas and natural gas companies by states is included. Companies desiring to compare their own accident experience with the record for their state, or with other companies of comparable size, may obtain their code number and the complete report upon application to the Statistical Department, Association Headquarters.

Gas Revenues Increase in March

MANUFACTURED and natural gas utility revenues amounted to $76,613,000, in March 1937, as compared with $72,489,500, for the corresponding month of 1936, an increase of 5.7 per cent, according to figures compiled by the Association's statistical department.

The manufactured gas industry reported revenues of $31,378,600 for the month, an increase of 1.0 per cent from the same month of the preceding year. The natural gas utilities reported revenues of $45,234,400, or 9.3 per cent more than for March 1936.

Manufactured Gas Sales Rise

Total sales of manufactured gas for the month were 32,786,600,000 cubic feet, an increase of 4.1 per cent. Natural gas utility sales for the month amounted to 127,632,800,000 cubic feet, an increase of 12.8 per cent.

Manufactured gas sales for domestic uses, such as cooking, water heating, refrigeration, etc. were 2.5 per cent below March 1936. Sales for house-heating purposes however, gained 11.9 per cent, while industrial and commercial uses gained 12.8 per cent.

Natural gas sales for domestic purposes showed an increase of 3.6 per cent for the month, while industrial sales gained 19.1 per cent.

Gas at New York Fair

THE gas industry will have its own building and exhibit at the New York World's Fair of 1939, official approval having been given by the Executive Board of the American Gas Association and the Board of Directors of the Association of Gas Appliance and Equipment Manufactures.

H. H. Cuthrell, of Brooklyn, New York, vice-president of The Brooklyn Union Gas Company, is chairman of the Committee on New York World's Fair.

"The participation of the gas industry in an authoritative and representative exhibit at the Fair is assured by the action taken by the two boards," Mr. Cuthrell declared. "The committee in charge of this activity has had one meeting and is now laying out tentative plans for the exhibit. We hope to keep the industry advised of developments."

The last national exhibit of the gas industry was at the Century of Progress Exposition, Chicago, 1933-1935.

Natural Gas Reserves in Oklahoma Field

THE Bureau of Mines, Department of the Interior, estimates on the basis of calculations made by the "pressure-volume" method that the Layton, Oolitic, and Oswego-Prue gas-producing horizons in the Oklahoma City oil field contained a combined initial gas reserve of approximately 267.6 billion cubic feet, that 214.6 billion cubic feet have been withdrawn from these formations up to January 1, 1936, leaving a gas reserve of 53 billion cubic feet, based upon an abandonment pressure of 100 pounds per square inch gage at the well head.

Producing Life Extended

These figures are the result of a study by R. E. Heithecker, petroleum engineer of the Bureau, who suggests that as the reservoir pressure declines nearer the assumed abandonment pressure the rate of withdrawals no doubt will become less and less, and the producing life of each zone will be extended for a much longer period than indicated by abandonment dates computed on the basis that the rates of withdrawal from these zones will continue at the same levels as have been maintained over the last several years.

Personnel Service

SERVICES OFFERED

Supervisor or sales engineer. Have had several years' experience in industrial, commercial, househeating and domestic sales. Am familiar with design, layout and installation of equipment. Graduate engineer and married. Desire to be associated with a utility or appliance company. **1116.**

Gas sales engineer. College graduate, experienced in marketing natural gas to institutions for heating; oil refineries, glass and paint companies; ceramic, ice and power plants, salt companies and heat treating plants. Familiar with design and installation of metering and burning equipment. **1125.**

Sales engineer. Will go anywhere, with gas company or manufacturer. Graduate engineer, excellent record, broad experience in the gas industry. Familiar with competitive fuels. Capable of supervision of sales, installation and servicing of commercial, heating, air conditioning and industrial equipment. Reliable, industrious and can demonstrate results by sales. **1126.**

Sales engineering experience in **industrial** and house heating fields, specialist in gas fired steam boiler applications; 18 years' experience with two of the largest gas companies. Thoroughly familiar with utilization, research and testing; technical instructions to company sales and maintenance personnel and making and following up installations. Married. **1127.**

Industrial or **house heating** manager. Man (36) with solid background of engineering, sales, and management experience in both fields. Old enough to be thoroughly trained. Young enough to take hold in a new organization. Broad knowledge of the gas industry and faith in its future. **1129.**

University graduate (37) unusually successful record in utility **advertising** and sales, seeks position making maximum use of both; located in New England. **1130.**

SERVICES OFFERED

Sales and **utilization engineer.** Long experience on gas appliances, merchandising, relation of utilities to retail outlets. Can specify correct appliance, supervise installation, make inspections, handle complaints. Gas fired boilers; experienced on special conversion burners. Industrial application and restaurant equipment. Will go to utility or represent manufacturer in the East. **1131.**

Advertising manager. Fifteen years' experience in all phases of advertising and sales promotion. Last six with important electrical appliance manufacturer. Straight-line thinker. Good copy writer. Three years with advertising agency. **1132.**

POSITIONS OPEN

Cadet engineer—natural gas utility in Oklahoma, geology, transmission, and leakage survey work. State education and salary required. **0321.**

Industrial gas engineer, natural gas experience, for natural gas company located in state of Ohio. State age, experience and enclose photograph with application. **0322.**

House heating salesman. Applications solicited for position as house heating salesman in New England territory of 14,000 meters having an attractive heating rate. **0323.**

Gas heating equipment **testing** and **research engineer** take entire charge of testing and research laboratory for large established manufacturer of gas boilers, conversion burners and air conditioning units. Must be technical graduate, have had experience in similar work and be capable of efficiently directing the efforts of others. Location New York City. **0324.**

PROGRESS REPORT

Six months ago *Personnel Service* announced and adopted classification of all "Services Offered" advertisers to "better serve the convenience and conserve the time of employers when considering the qualifications and experience of prospective employees." The same announcement mentioned also that "correspondence during the year 1936, and notably toward its close, seems to indicate a distinctly better spirit and more encouraging tone."

After constant checking and systematic "follow-up" there are now in the active file only 113 Confidential Classification Records—together with the foregoing eight advertisements.

These advertising columns are available to Association members without charge; space is limited to fifty words, except to the gas company or manufacturer advertising a vacancy. No charge is made, the service is confidential, and key numbers preserve the advertiser's anonymity.

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